

FEBRUARY 1992

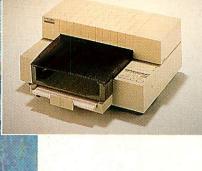
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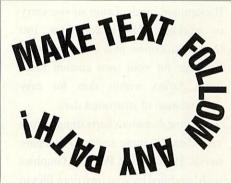
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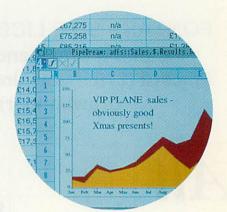
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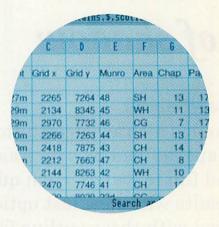
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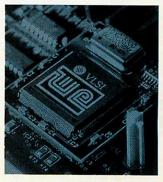
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Typing Tutor	CIS	£17	MEMORY, MISCELLANI	EOUS
U.I.M	Fourth Dim	£23	Fitting extra unless	stated
Utility Disc 1	Data Store	£13	† Fitting easy ‡ Fitting n	
Utility Disc 2	Data Store	£13	A2000 2 Mb New washed black	eeus e
Utility Disc 3		£7	A3000 2 Mb Non-upgradable †	
	Data Store		A3000 2 Mb Upgradable †	IFEL
Utility Collection	Data Store	£21		mwide/l
View»Mac 3	The same of		A310 2 Mb Upgradable soldere	3 # IF
W Iew» Mac 3	Human	£65	- as above + MEMC1a	
- Arc/Mac Cable	Human	£24	- as above + MEMC1a + fitti	
Vox Box	Clares	£47	A310 4 Mb soldered + MEMC1a - as above + fitting	1 # IFI
White Magic	Fourth Dim	£14	- as above + fitting + OS3 ca	arriers
White Magic 2 + Designer	Fourth Dim	£14	A540 4 Mb †	Atomy
Wimp Game	Fourth Dim	£12	ARM3 ‡	Atom
Wonderland	Virgin	£24	Dongle Dangle with screw fitting	IS ICS
Words and Pictures	Chalksoft	£17	4-slot 4-layer Backplane	IFEL
World Championship Boxing N	lanager		A310 RISC OS Carrier Board ‡	IFEL
	Krisalis	£20	A300/400 Fan kit	ICS
World Geography Maps, draw	Micro Studio	£23	Fan filters (set of 10)	ICS
WorldScape	Eclipse	£15	Whisper Fan Quietener	ICS
World Wildlife, sprites	Micro Studio	£16		
Worra Battle	Oak	£13	MICE, MONITORS	
WorraCAD	Oak	£75	IMIOL, IMOTHE OTIO	
Worra Plot	Oak	£24	Clares Micro Mouse	Clares
Trolla Flot	Cun		9060S	Eizo
X-Fire	Fourth Dim	£19	9070S	Eizo
X-Lile	Fourth Dim	FIB	90703	EIZU
Z88: A Dabhand Guide	Dabs VO	£15	SCANNERS, DIGITISER	s
Z88 PipeDream Guide		£15		
Zarch	Superior	£14	ArcScanner including Epson GT	-4000
Zelanites	Micro Power			Clares
		23.500		The second second

HARDWARE

A5000 COMPUTERS & UPGRADES

2Mb Hard Disc Colour System Acorn	£1499
- as above + Learning Curve	£1530
(Finance & special purchase schemes ava	ailable)
A5000 4 Mb Upgradable † Atomwide	£109

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ArcLaser	Calligraph	£895
ArcServer	Calligraph	£985
Bubble Jet BJ-10e	Canon	£205
Bubble Jet BJ-300	Canon	£360
Bubble Jet BJ-330	Canon	£405
Laser Direct HiRes4 with 50-	sheet tray CC	£895
- with optional 250-sheet		£999
Laser Direct HiRes8	CC	£1280
Laser Direct LBP-4 Card	CC	£319
Laser Direct Qume	CC	£799
LBP-4	Canon	£659
Refill toner cartridge for Cana	on EPS	£50
New toner cartridge for Cand	n LBP-4	£59

FUNCTION KEY STRIP ORGANISER

Arckey	105	VULS
- set of 4		V0 £10

ANEOUS

Fitting extra unless stated	
† Fitting easy ‡ Fitting needs expert	ise
A3000 2 Mb Non-upgradable † IFEL	£55
A3000 2 Mb Upgradable † IFEL	£63
A3000 4 Mb † Atomwide/IFEL	£149
A310 2 Mb Upgradable soldered ‡ IFEL	£99
- as above + MEMC1a	£149
- as above + MEMC1a + fitting	£200
A310 4 Mb soldered + MEMC1a ‡ IFEL	£225
- as above + fitting	£277
- as above + fitting + OS3 carriers	£298
A540 4 Mb † Atomwide	£270
ARM3 ‡ Atomwide	£249
Dongle Dangle with screw fittings ICS	£6
4-slot 4-layer Backplane IFEL	£59
A310 RISC OS Carrier Board ‡ IFEL	£25
A300/400 Fan kit ICS	£15
Fan filters (set of 10) ICS	€4
Whisper Fan Quietener ICS	£15

Clares Micro Mouse	Clares	£26
9060S	Eizo	£450
9070S	Eizo	£640

SERS

	Clares	£1660
FaxScan	Spacetech	£94
FX9600AT + Maintenance	Amstrad	£376
Hawk V9	Wild Vision	£199
- A3000 version	Wild Vision	£278
Image (colour)	Irlam	£589
Image Scanner	lota	£389
- Colour upgrade	lota	£98
i-Scan 200	Irlam	£539
i-Scan 400	Irlam	£589
Scan-Light A4	CC	£346
- with Sheet Feeder	CC	£431
Scan-Light Junior	CC	£165
- A3000 internal	CC	£165
Scan-Light Junior 256	CC	£199
- A3000 internal	CC	£199
Scan-Light Professional	CC	£840
 as above + SCSI interface 	CC	£940

I²C PRODUCTS

AnDi Oddule	Baildon	£49
I2C Adaptor (needed unless you	J	
already have an I2C socket)	Baildon	£10
I2C SWI (enhanced IIC Control) Baildon	£15
- bought with Oddule		£5

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
- Archimedes	Kador	£14
- A3000	Kador	£14

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Thinking IDE?

Look at these examples of our

NEW LOW PRICES

➤ A3000 INTERNAL 40 MB - ONLY £399!

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All with power save, write protect, I2C connector, etc Miniature fan option for fully upgraded A3000s

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With power supply and metal case to hold two hard discs

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We offer a full range of internal and external hard disc upgrades and separates. Telephone for more details and friendly advice based on a year's experience in selling IDE products.

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HOW TO ORDER

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Overseas carriage: If you are paying by credit card we will add airmail and insurance at cost. Otherwise please add £6 (Europe) or at least £12 (elsewhere) for each software item and send a pounds sterling bank draft payable in England, or Eurocheques for not more than £100 each.

Credit cards are welcome. We do not charge your account until your order has been fulfilled. The name and address for delivery of goods should be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due.

Official orders are welcome. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

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LICENSED CREDIT BROKER



VT320/VT102/VT52/ANSI terminal



Viewdata terminal



Prestel



Auto logon number directory



- · Fully RISC OS compliant
- · Multi-tasking, including background file transfers
- VT320, VT102, VT52, ANSI and Teletype scrolling text terminals
- · Viewdata and Minitel (CEPT 2) terminals
- Viewdata editor, telesoftware downloading and frame tagging
- Advanced Tektronix 4105 colour graphics terminal using Draw file format
- · Scalable terminal windows in all screen modes
- Xmodem, Xmodem1K, Ymodem, Zmodem, Kermit, SEAlink and ASCII file transfer protocols, including batch transfers
- Campus 2000 terminal
- · Comprehensive script language based on a subset of C
- · User menu may be customised for special applications
- · Macro processor and fully definable keyboard
- · Support for RISC OS printer drivers
- · Number directory with auto logon and password protection
- · MNP 2 and Vasscom link level error correction
- Modem drivers for most popular modems. Additional drivers may be written in the script language and added to the system
- · Facility to automatically record logon procedures
- Supplied with a 200-page ring-bound user guide

Price: £75 + VAT

Upgrade from version 1 includes new package, user guide and discs. To upgrade, please return your original disc to the address below. Price: £35 + VAT + £3.10 p&p. Total: £44.22



RISC Developments Ltd. 117 Hatfield Road, St. Albans, Herts. AL1 4JS Tel: (0727) 40303 Fax: (0727) 860263



EUREKA! NEW ARC SPREADSHEET READY

LONGMAN Logotron is continuing the policy of extending its activity beyond educational software by releasing a new spreadsheet package for the Archimedes range.

Eureka has been two years in development and is largely the work of an Americanbased programmer, who has worked to bring the innovative features of the latest PC and Apple Macintosh spreadsheets to the Arc world.

Julian Pixton, Longman Logotron's technical director, said he is 'confident that Eureka will quickly establish itself as the best spreadsheet in the Acorn world - bar none.'

Key features include:

- Support of outline fonts, variable row heights and column widths
- Multiple worksheets and linking for 3D modelling
- Import and export of data (in Lotus 123, DIF, text and CSV format)
- Ability to create userdefined functions and macros
- The overlaying of graphics on worksheets
- Cell colouring and shading

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- Worksheet zoom in and out
- Window splitters, allowing different areas of worksheets to be viewed next to each other
- Offers more than 120 builtin functions

Longman Logotron has paid special attention to the design of the user interface. 'As with all our products,' said Julian Pixton, 'we aim for a low threshold, to enable users with limited confidence and experience to get going, while

offering a high ceiling for experienced users to do all they require, and more.'

Eureka is due to be previewed at the BETT '92 exhibition this month and will be on sale from March 1992. It costs £119 for a single user copy and £400 plus VAT for a site licence. Contact Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel: (0223) 425558.

PRESENTING THE CABLENEWS

TWO new products aimed at making graphical presentations easier are being launched by Lingenuity. Presenter GTi is a Risc OS-compliant package for the preparation of presentation graphics, while Cable-News allows the user to compile an overall presentation, including material from any Risc OS application.

Lingenuity's Based on Hotlink Presenter, Presenter GTi features a wide selection of graphs including horizontal and vertical bar charts, stacked bar charts, a choice of line and area charts, pie charts, regression lines, scattergrams and the ability to use logarithmic scaling on the graph axis.

Other features include: a dynamic worksheet area, full auto-scaling axes, live update of graphs from Pipedream, selectable graph colours, line and point types, fast redraw of graphs and exportable graph data in the form of formulae components.

Presenter GTi costs £69.95 plus VAT. Education prices and site licences are available from Lingenuity. The price of Hotlink Presenter has been dropped to £39.95 plus VAT.

CableNews, written by X-Ample Technology of Holland, can use data, charts and other material prepared in other Risc OS packages. Individual presentation screens

can be printed through Risc OS printer drivers.

The package comes as two applications - CableMake is the authoring system, and CableView allows playback of the presentation.

CableNews is Risc OS 3 compliant and uses the full range of Risc OS outline fonts. Sprites, Draw and text files can be dragged into pages. The software is mode-independent, with full support for the new A5000 VGA modes.

Both packages, Presenter GTi and CableNews are both available from Lingenuity, Wood Farm, Linstead Magna, Halesworth, Suffolk IP19 0DU. Tel: (0986) 85477.

SHOPPING **AROUND**

THIS year's Computer Shopper Show saw a smattering of Acorn stands. Acorn was showing off the new A5000; The Fourth Dimension was getting fed up with people going 'Wow!' at their games, then walking away when they realised they weren't for the PC; Computer Concepts was showing off *Artworks*; Pres featured its range of peripherals; Ian Copestake Software displayed IDE hard drives and various mind-bending applications; Elite was on show; and the guys from The Serial Port were making their usual racket.

One event, which was definitely worth watching, was the French gourmet, Monsieur Mangetout, eating a 386 PC but wouldn't an Arc have given him more byte?

LOWERING THE TONER

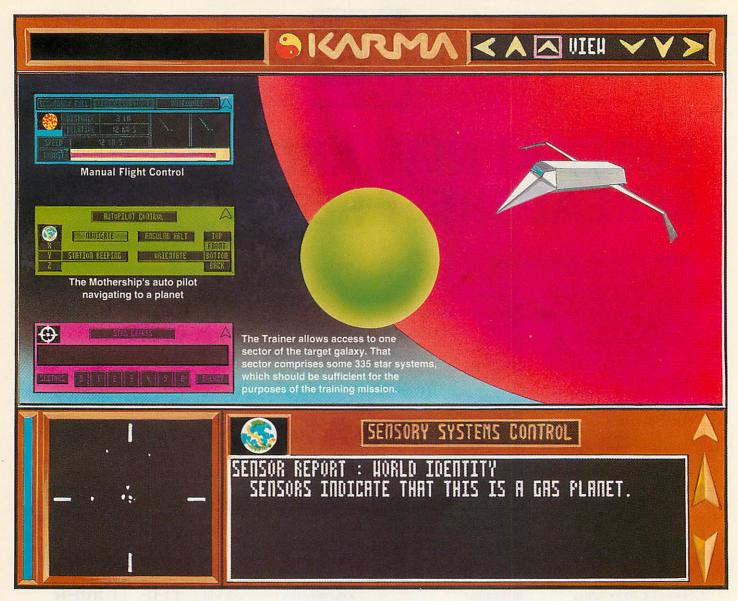
BEACH Imaging claims that its product, the Perma Jet Long Life Toner, can cut the running cost of a laser printer by at least 50 percent.

The company points out that new toner cartridges cost up to £95 each but, at £190 for the Perma Jet system, recharging the cartridge gives a cost of around £38 per refill, since each recharge pack contains five refills.

For more details contact Beach Imaging, 205 Glenesk Road, London SE9 1RD. Tel: 081-850 8344.

PRIZE DRAW

WINNERS of the Atomwide prize draw at the recent BBC Acorn User Show were: Mr M Foreman of Bristol, who won an 8Mb A5000 upgrade and Mr E McDowall of Surbiton who won an Arm3 upgrade. For another chance to win an Arm3 - this time from Watford Electronics - take a look at our competition page.



THE COUNTDOWN HAS BEGUN

The Universe has begun to contract and the threat this poses to our home galaxy has provoked an ambitious plan - a pathfinding mission to the outer regions of the universe in search of new galaxies for colonisation. In preparation for this mission, the

Galactic Council has developed a simulator in which pilot cadets can begin to acquire the many and diverse skills required for the pathfinding mission. Towards this goal, you are invited to commit yourself to participate in the Flight Trainer.

The Galactic Council

The Council has resolved that those cadets who commit to the training programme will be entitled to an allowance of the cost of the Trainer against the price of enrolment in the pathfinding mission. Cadets who successfully complete the training programme, and who wish to take part in the pathfinding mission, are expected to be able to commence their vast journey in the next year.

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Please enrol me in Flight Training pro		lactic
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I enclose a cheque £25.99 which inclu (please add £2 ext UK) made payable Software Ltd. Plea for delivery.	ides post ra if outs to Peris	/packing side the cope

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TBA

Release 2.00

Release 3.00

The Flight Trainer

Trainees will be expected to become proficient in the skills of Flight, Navigation, Exploration and Sensing of the natural environment, and in order to graduate, will need to complete specific tasks, the nature of which remains top secret.

Periscope Software Limited 302 Wedon Way, Bygrave, Baldock, Herts SG7 5DX. Tel. (0462) 893107 Fax (0462) 490088



6	KA	RA	11



WATFORD LAUNCHES NEW **256-GREY SCALE SCANNER**

WATFORD Electronics used the recently-held open day on its premises to show a new 256-grey scale scanner for the Archimedes and BBC A3000.

Offering up to 400 dpi (dots per inch) resolution, the new scanner features the latest IC technology, enabling the company to incorporate a faster and more accurate scanning input device.

A standard width 105mm scanner is used, but Watford has sourced a new scanner mechanism which can cover images at 3ms per line at any resolution. This means that the scanner interface podule has to deal with the scanned image data at a rate of up to 585Kb per sec. So a postcard-sized image can be scanned in 7.3sec in 256-grey level mode, giving 3Mb of data. The scanner uses its entire 105mm width for 400dpi scans.

Switches on the scanner are used to select scanning resolution and the desired grey-level modes and these are automati-



cally sensed by the supporting software, which can hold up to four images in buffer memory. It is possible to perform a number of enhancements to the image and see the results in one buffer window, while retaining the original image in another buffer window.

Images can be scaled to fit pre-set windows, and can be displayed in two, four, 16 or

256-grey levels with appropriate monitors.

Other software features include five types of edge detection, matrix image enhancement, image smoothing and tone elimination.

For further information. contact Watford Electronics. Jessa House, 250 High Street, Watford, Herts WD1 2AN. Tel: (0923) 37774.

GETTING ON BOARD

OAK SOLUTIONS has launched a package for the design of printed circuit boards. The package, Oak PCB, is a fully Risc OS-compatible schematic design program.

The package comes with a comprehensive toolbox, which provides may of the features found in Draw. It also, however, contains tools specifically for use with printed circuit boards.

Pads of many styles can be created in a wide range of sizes, and single in-line (SIL) and dual in-line (DIL) arrays of pads can be generated automatically.

Tracks of any thickness are created such that all elements run at multiples of 45 degrees to help with neat board layout. Drawing tools are available for creating artwork for the silkscreen layer and component overlay and text can be placed at any size.

Circuit boards with up to four copper layers can be created. Two part libraries are supplied. One provides the PCB layout for all common electronic components. The other provides a library of schematic symbols.

Oak PCB costs £150 plus VAT from Oak Solutions, Suite 25, Robin Enterprise Centre, Leeds Rd, Idle, West Riding BD10 9TE. Contact the company on (0274) 620423.

A PIPEDREAM COMES THROUGH

COLTON Software has just announced the launch of Pipedream 4, which the comdescribes as 'fundamental revision' of its popular spreadsheet. Penguin Graphics, Colton's new presentation mode, allows the user to utilise graphic images within their charts.

Other new spreadsheet features include custom functions

PipeDream: Untitled1 1 PipeDream: Chart3 1 @ PipeDream: Chart5 REAM 4: ENHANCED GRAPHICS

and user-programmable function libraries; an optional popup formula window and template files to speed the creation of documents.

User interface enhancements are numerous, and include: dragging column borders and margins; an auto-width command; a facility to display documents in the window in the line height used when printing; and the mouse and function key operations have been simplified.

Pipedream 4 costs £196 plus VAT. Pipedream 3 users who wish to upgrade will pay £80 plus VAT if they purchased before August 1 1991, or £50 plus VAT otherwise. For further information, contact Colton Software, 2 Signet Court, Swanns Road, Cambridge CB5 8LA Tel: (0223) 311881.

POINT TAKEN

LONGMAN Logotron is releasing Junior Pinpoint. Aimed specifically at primary schools, it has a simplified user interface. It is a scaled down version of the original data collation package, PinPoint, but is considerably cheaper.

Junior Pinpoint should encourage children to collate, analyse and present their information in a colourful and interesting way. It will cost £24 plus VAT and should be available in March. For more details, contact Longman Logotron on (0223) 425558.



CUMANA ADDS FOUR MEGABYTE BOARD TO THE ARCHIMEDES

CUMANA, manufacturer of add-ons for the Arc, has launched a board that adds 4Mb of Ram to the machine

The board provides fast access to 4Mb of memory by using 80-nanosecond DRam technology, in the form of four 1Mb DRam chips.

Cumana says that the board's consumption is low enough that the A3000's existing power supply will not feel any extra strain, and that it is designed to avoid the need to move the keyboard when fitting the board, which plugs into the expansion slot.

The board costs £155 plus VAT, and is currently available from Cumana dealers. For furinformation contact: Cumana Ltd, Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH. Tel: (0483) 503121.

Cumana says it will 'put over £100,000 back into edu-



cation at the BETT '92 show to be held at the Barbican Centre, London from January 22 to 25. The scheme is to be called The Computer Club but the company is being mysterious about further details.

Also at the BETT show, Cumana will be launching a range of SCSI (small computer system interface) interfaces for the Archimedes. New features include a software utility for non-experts to ease installation of data storage peripherals. Another option will peripherals. enable SCSI including CD-Rom drives, to be simultaneously attached to several Acorn computers.

KODAK LOWERS PRINTER PRICES

KODAK Printer Products has announced a major price reduction for its colour inkjet printer, the Diconix 330C, from £799 to £699.

Ernesto Jaconelli, Kodak's business development manager, said: 'The growing number and sophistication of colour software packages has led to an increased demand for colour printing on the desktop, allowing us to make a signifi-

cant reduction in price.'The 330C features plain paper operation and gives the user a choice of either cut sheet or tractor feed paper.

A 60-sheet A4 cut sheet feeder is built in, and inkjet transparencies can also be Printing accommodated. options are selected from an LCD panel on the front of the machine. Four separate inkjet cartridges are used to give up to 330 different shades with 192 dpi resolution.

Kodak has also launched a low-cost notebook-size printer, the Diconix 180si. It is an upgrade of the Kodak Diconix 150 Plus, the printer has extra fonts, including Prestige, Hevta and Gothic. A front panel has been also been added to make it easier to change printer parameters, which used to be done using dip switches. The user's settings and changes are printed out by the machine.

The 180si prints on cut sheet or tractor feed paper or inkjet transparency materials. Output quality is 192 dpi, and smudge-resistant ink ensures that images are fixed immediately after printing.

The Kodak Diconix 180si is available from Kodak dealers at £299 plus VAT.

For more information contact: Softsel Ltd, Softsel House, 941 Great West Road, Brentford, Middlesex. Tel: 081-568 8866.

NEWS IN BRIEF

 THE ARMY has recruited the latest Acornmachine, the A5000, to help with its skiing championships. The UK Land Forces Alpine Ski Championships - known as Exercise Spartan Hike 10 - will be held in Switzerland later this month. Around 150 competitors from regular and territorial units throughout the UK will take part.

All timings and calculations will be processed by an Acorn A5000, using Pipedream, Flexifile and Impression 2. At the end of every race, each competitor's total time, race points relative to the fastest skier, and position in the league table are calculated. The A5000 will then produce their seeding points from previous race performances to calculate their start position for the next race.

 COMPUTER CONCEPTS is cutting the price of some of its BBC products. BBC Interbase Rom goes down to £20 plus VAT, while the Speech Rom, Accelerator BBC Basic Compiler, Termi and Communicator will each cost £10 plus VAT.

The company is also cutting scanner prices. The Scanlight A4 is cut from £399 to £299 plus VAT, while the Scanlight Junior goes from £189 to £129 plus VAT. The Scanlight Plus software has also been upgraded. The upgrade will be available to all Scanlight owners free of charge.

For details contact: Computer Concepts on (0442) 63933.

 PINEAPPLE is launching a new version of its Digitiser software, available as a free upgrade to Digitiser owners. The latest version will capture a sequence of frames with a predefined gap between frames. A replay option is also provided that can operate at any desired speed.

The company is also launching a PAL decoder that allows a computer monitor to act as a TV set. This will cost £79 plus VAT. For more information contact Pineapple Software on 081-599 1476.

 CLUB A3000, the independent Archimedes user group, is holding a training day on February 23 for those who want to get the most out of Edit, Paint and Draw.

The tutorial includes hands-on instruction, and a working lunch. It will cost £12.50 for the day - all profits to club funds. For more details contact Steve Arnold on (0223) 214411 ext 411.





COMPOR YOURSEN

Last week, Miss Brown was in a tangle. Her music class wasn't prepared in time. One group wanted to play the drums, but the music budget barely stretches to a tambourine. Another wanted to write its own music, but it all got rather messy. In the end, she got them all to sing a round song.

This week, Miss Brown is using *Notate*. Now composing music is easy — notes, rests etc. can be placed directly on the screen. Then the music can be played back immediately, and changes made to rhythm, tempo or pitch. When it's done, they're going to print out their piece — a nice neat copy for every musician in the class.

Next week Miss Brown is going to introduce 'Music of the World'. African rhythms, marches, rap, pentatonic scales — *Notate* can do the lot. It's even simple to move individual parts between tunes — ever heard the National anthem with a reggae percussion section?

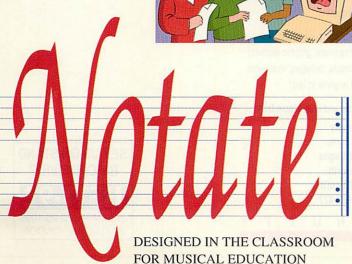
Notate uses the standard Archimedes 'voices'. The computer can sound like anything from a cow bell to a trombone, from a melodic tom-tom to a hand clap. And up to eight of these 'instruments' can be played at once.

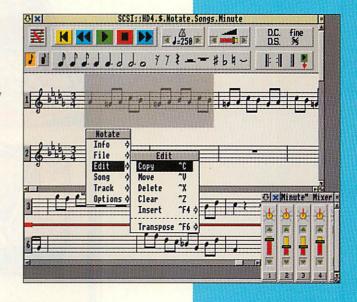
Miss Brown has a sound sampler attached to her Archimedes too, so she can record more of her own instruments. Including the human voice. So now three students are singing a barber shop quartet — the computer is humming the fourth part.

Whether you want to play percussion with seven year olds or think theory with seventeen year olds,

compose yourself — with *Notate*.





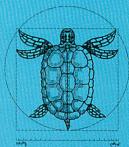


Notate offers the following features:

- Comprehensive support materials in the manual and on disk
- Up to eight individual staves
- A wide range of synthesised and sampled sounds
- Ability to use accidentals and repeats
- Full range of time and key signatures with control over tempo and volume
- Automatic checking of note length relative to the bar space remaining
- Easy-to-use tape recorder style control panel
- Chord facility
- Mixer controls to adjust stereo balance and volume of all tracks
- Configurable for different levels of musical skill
- Editing facilities which, like word processing, include cut, copy, move and delete within bars, staves or between compositions
- Up to four compositions editable simultaneously
- Ability to transpose single parts or whole compositions
- Export and import of MIDI format 1 files
- Ability to play via MIDI where a suitable interface is fitted.

Notate is available now, priced at £59.

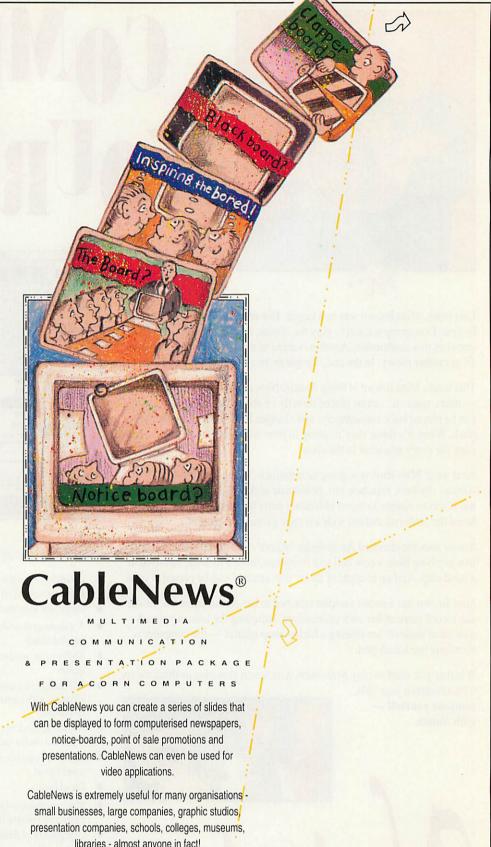
A site licence for Notate costs £190 for a primary school and £330 for a secondary school



LONGMAN LOGOTRON

124 Cambridge Science Park Milton Road Cambridge CB4 4ZS

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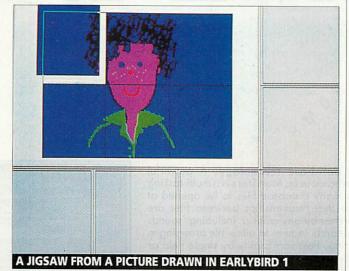
IS THE EARLY BIRD BEST?

AT LAST a bundle of programs specifically designed for kindergarten and infant children!

The EarlyBird series of software has been written for an LEA project being carried out in Hereford and Worcester. Set up by the Primary IT Coordinator, Pat Tattersall, the scheme is designed to bring the Archimedes computer into the kindergarten classroom. Over a period of three years they hope to see 'whether using IT at an early age has an effect on learning - as opposed to children who don't have access to computers'.

However, it soon became evident that there was a lack of suitable software for this age group and so the EarlyBirds series came into existence.

EarlyBird 1 is a mousedriven painting program with a 12-colour palette, three brush sizes and fill options. It is



being used to great effect by children as young as three. In EarlyBird 3: Cut-Up, pictures drawn in EarlyBird 1 are made into an easy-to-use jigsaw; the grid is teacher controlled. Or play Snap with your own

designs in EarlyBird 4:Snap. EarlyBird 1, £25, is ready now; EarlyBird 3: Cut-Up, £15, and EarlyBird 4: Snap, £12.50, will be available soon from IT Service, Bilford Road, Worcester WR3 8QA.

BETT'92 SHOW

AS WELL AS viewing the vast

array of hardware and software

on display at BETT '92, don't

forget to leave some time free

to attend one of the many

The seminars cover a variety

of topics, some more specific

than others. These include the

flexible approach to support-

ing IT in the classroom, the

place of geography, history

and cookery alongside IT and

the National Curriculum, and

access for special needs' stud-

ents. So there should be

something of interest available

You don't need to book a place for any of the seminars,

seminars on offer.

for most visitors.

THE COMPUTER SHOPPER

WITH greater emphasis on presentation, students often need pictures to illustrate their wordprocessed documents. Few schools have enough machines for pupils to scan or draw the images they require, but DEC_dATA has come up with an answer – a catalogue disc, with the files grouped under headings. Using the special catalogue software, it

allows you to pick and mix the clip art, images and datafiles that are then put on to disc.

The software will keep a check on the files ordered, and print out a ready calculated order form for you to send back. To order a catalogue disc send a £1 cheque to David Cornforth, at 60 Danes Road, Exeter EX4 4LS. Tel: (0392) 221702



just turn up at the right place, but do get there in plenty of time as the number of places is restricted. The exhibition is

being held at the Barbican. from Wednesday 22 Saturday 25 January.

For more details of the show see our BETT '92 preview on page 57 or phone 071-404 4844. Advance tickets can also be obtained from this number.

Sharon Halpern

TAKE NOTE!

WITH more schools now buying Archimedes computers, Ian Waugh has been keeping his ears open for BBC music programs adapted for the Arc. Ted Kirk's Theory of Music and Play What I Play are two such programs.

Theory Of Music includes Level 1 to bring the beginner up to the level of the Questions and Exercises program. With three units it is quite thorough. Each topic is explained onscreen and it asks questions every so often just to make sure you're paying attention.

Questions and Exercises is a practice and revision aid. Divided into eight sections (key signatures and tonic triads, scales, intervals, time signatures and bar lines, rests, terms and signs, chord arrangements on two staves, and cadences) it covers the basic theory for Grades two to five, and a bit beyond in the sections on cadences and chord formation. Each section has several options so you can concentrate on the area requiring practice.

Play What I Play is a 'follow my leader' game to develop your musical ear. A series of notes are played which you then have to pick out on the on-screen keyboard. Options include seeing the first note and setting how often you hear the tune. At its most difficult it can be quite fiendish!

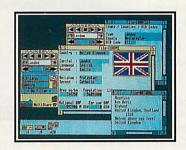
The programs are not Risc OS based but do use the mouse although this isn't consistent. Some menu selections are made via the mouse but others require a keypress, and while most questions can be answered with the mouse you have to press z to move onto the next question. If a program uses a mouse you shouldn't need to use the keyboard at all.

The Theory of Music programs, £16 each, and Play What I Play, £13.50, come with a user's handbook and a set of teacher's notes. If your music theory needs brushing up contact Ted at 33 Humber Crescent, Sutton Leach, St Helens, Merseyside WA9 4HD. Tel: (0744) 818761.

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packages. MultiStore is a professional package and probably the most comprehensive database available today. £199 + V.A.T. (£233.83 inc. V.A.T.)

FLEXIFILE The perfect database for education and small business users. FlexiFile is a new powerful multi-tasking database with friendly screen displays. Multiple files may be open at the same time with relational linking between any two files. FlexiFile allows fast sorts to be carried out and with its soundex searching allows even mis-spelt items to be found. Mathematics can be performed using the macros while indices allow you to browse the records in more than one order without performing sorts. FlexiFile lives

up to its name giving the user full flexibility with ease of use. £99 + V.A.T. (£116.63

inc. V.A.T.)

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* Graphbox is not a database, but can be used with any of the above programs for reproduction

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BULLETIN BOARDS GROW

THIS month I thought I would take a look at some of the developments and events of the past year. Not only did modems become faster during 1991, but the number of bulletin boards started by enthusiastic hobbyists grew considerably. This in turn led increased competition between different boards, each trying to recruit members.

There are many factors that people who are new to comms weigh up when it comes to deciding which board to log on to. Probably the foremost questions concern the location of the board, or how much it costs to log on to it. Although there are now hundreds of bulletin boards up and down the country, there will not necessarily be one within local calling distance.

However, many of the larger boards now support various types of networking, of which

the most common is Fidonet I described this in more detail in my February 1991 column when it was still fairly new in this country. It essentially means that you can post an electronic message on one board and it will be echoed around the country. You can thus log on to one or two regular boards, safely knowing that you are also keeping up to date on events and gossip all around the country, just by checking Fidonet conference areas on the board.

Most of the Archimedes-run boards now seem to be using The Serial Port's ArcBBS, which has become something of a standard - maybe because there are no other Archimedes host systems available. If you otherwise, then we would like to know about it. This standard host system means that most bulletin boards use the same general

menu structure - again this is helpful for new users in that most commands use the same keypresses such as F for file areas and G for goodbye.

Coupled with faster modems and offline readers, you can really cut down your phone bill by following a few simple guidelines. Make a quick note of what you want to obtain from a bulletin board when you log on - perhaps you want to see what new messages are there, download a couple of files or send a message to your friend Fred. By deciding what you want to do before you actually dial up the board, you may discover that you can program most of your online session into your comms package, especially if you can program a script file for it. I intend to cover script languages, such as those found in ArcTerm and ArcComm, in future comms columns.

NEWS IN BRIEF

- By the time you read this issue, Arcade BB in London should have a fourth line fitted, so there will be slightly less chance of getting the engaged tone when you dial it up. The new line will be on the 081-654 2212 group and should cater for all speeds.
- For those of you who are interested in electronics but don't like ordering components by filling in application forms and sending them off, you may like to know that you can order components via Maplin's own electronic ordering service. This works very much like a bulletin board. Just set your comms software to ANSI, 8N1 and dial (0702) 552941.

When you connect, you will be asked for your Maplin customer number which you were given the last time you ordered components by post. If you don't have a number, online help is provided. You can then go ahead and order your components. One great advantage of this system is that you can instantly see if a particular part is in stock or not, and order an alternative if required.

- If you are interested in Silicon Village, the new national viewdata network designed to replace Micronet, you will be pleased to know that local access is now available via the Mercury 5000 network. This means that you no longer have to dial London or Reading in order to look around. If you haven't seen the service yet, try dialling 081-759 9669 with your software set to viewdata, 8N1. Note that this is slightly different from Prestel's 7E1. New areas are being added all the time, based around a fictitious village.
- For the latest sysop news and details of the XFS bulletin board host system from Keydata, you can dial straight into their very own BB, called ORB. The board is based in London on 081-761 8220 and runs on a BBC running the latest version of XFS+. A number of other areas, including messaging and downloads, show off the features of XFS+.
- If you have any comms news or tips, please write to: Comms Column, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.

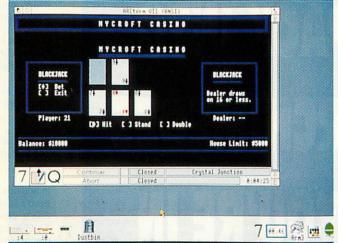
CALLING AT THE CRYSTAL JUNCTION

THIS month's featured bulletin board is Crystal Junction, based near Dudley in the West Midlands. Although it is running on a PC it contains numerous areas that may be of interest to Acorn users, including a detailed BBC download section, although as yet there is no Archimedes telesoftware.

There is also quite a detailed area on genealogy, so if you are trying to trace your family tree or know someone who is, you may find a host of useful software you can download.

One of the most impressive things on the Crystal Junction board is the selection of online games. Empire is a massive space game along the lines of Startrek. Casino is a full featured casino which contains various card games such as Draw Poker, High/Low and Blackjack and also a horse racing game.

If your comms software can support ANSI graphics, then you are in for a real treat here as high resolution graphics are



POP IN FOR A GAME OF BLACKJACK

used for these games. Each card contains user defined graphics to depict the suit, so rather than just seeing numbers, actual graphics are used.

A number of message bases are also provided, together with access to Fidonet. You can call Crystal Junction on (0384) 441929 if you set your software to ANSI, 8N1.

 Do you run a bulletin board that you would like to see mentioned on this page, or perhaps you would like a mention for a board that you have just discovered. Tips or recommendations will be welcomed and, of course, shared with fellow Acorn users. Send details to the address opposite.

Paul Vigay

FED DACK

-INDIGKE

FaxPack is a fax expansion board for the Archimedes range of computers allowing your computer to take on the job of a conventional fax machine but with the benefits of being fully integrated into the Archimedes.

FaxPack offers full background send and receive capability. You can send a fax simply by selecting the PRINT option from any RISC OS application, with control returned in just a few seconds. FaxPack then proceeds to dial and send the fax while you carry on using the computer.

Receiving faxes is also completely automatic. FaxPack will answer the phone and store the fax away on your disc while you continue to use the computer. Once received the fax can be viewed on screen (using a special anti-aliased display to improve on-screen readability) and printed. Any portion of the fax image can be saved as a conventional sprite. Alternatively FaxPack can be made to automatically print on receipt of a fax, which with a LaserDirect printer, is completely automatic and in the background.

There are numerous advantages of a computer based fax system over a conventional machine:

- Very high quality, pixel perfect faxes try sending a fax of 9pt text from a conventional fax machine!
- Since there is no need to print, then re-scan a document, FaxPack saves time, paper and money when sending faxes.
- ☐ Rather than junk fax mail wasting your costly fax paper, you can decide to delete unwanted fax files before printing.
- ☐ By receiving and sending from the computer FaxPack offers a higher level of security than most conventional fax machines.
- ☐ FaxPack allows electronic archiving of fax messages and is one step towards the truly paperless office.
- ☐ FaxPack uses your standard Archimedes printer and so can print on plain paper rather than thermal paper.

In addition FaxPack can be used as a data modem, to send and receive any Archimedes file or directory of files to other machines fitted with FaxPack. Because of the 9600 baud rate of fax systems and the use of data compression FaxPack is faster than practically all conventional data modems and permits background data transfer.

FaxPack £299 + VAT (£351.32)

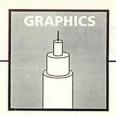




Computer Concepts Ltd

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Tel.: 0442 63933 Fax.: 0442 23 1632



EVERY PICTURE CAN TELL A STORY

THE RESPONSE to my request for readers to send in their graphic images has been very good. They can be split into three categories: those drawn with art packages, those produced using a rendering package, such as Clares' Illusionist, and those created with readers' own programs.

Perhaps the most interesting one so far (and definitely the weirdest) is a picture called Elsewhere by Mike Williams. This was produced entirely with Mike's own software and bears a close resemblance to the art of William Latham, an acclaimed artist who works mainly on purpose-built graphics workstations. It just goes to show what the Archimedes can do.

Due to lack of space, we are only able to print one of the pictures received each month,



although we will try to fit as many as possible on to the monthly subscribers' disc.

This month's disc includes the above, Magus from B Adlington and Warrior from Steven Nisbet, all compressed

using Compression. The PD CFS reader is included on the disc to decompress them. A £20 prize goes to the one published on this page, £10 for each of those placed on the monthly disc.

MOVING IMAGE

FOLLOWING on from the success of its range of monochrome and colour scanners. Irlam Instruments has ventured further into the world of digitising with the Moving i-Mage Multimedia System.

The system can display realfull-colour pictures directly on the desktop. Dedicated video hardware is used to achieve uninterrupted scaling and panning of the image.

Full 24-bit colour is used, giving a picture made up of 256 out of any of 16,777,216 colours. Because the picture is displayed entirely by hardware, it makes it possible to show full 24-bit colour images, even in 16-colour screen modes.

The Moving i-Mage consists of a single half-width podule into which the digitiser is plugged. The actual podule is a specially designed bus that allows fast communication between the computer and digitiser. The latter is removable from the bus card to allow future low-cost upgrading and expansion.

Control over brightness, contrast, saturation, hue and RGB balance is all performed in software. An application allows users to incorporate the digitiser's facilities in their own programs.

The Moving i-Mage contains its own VRam (Video Ram) which can be addressed directly to produce captioning and other special effects. Because of this, the hardware can be used as a 24-bit colour graphics card, capable of operating within the desktop.

Uses for the Moving i-Mage include any application where real-time, full-colour motion video is required, including computer-based training, video editing and multimedia.

Although the Moving i-Mage is not cheap at around £1000, it stands up well when compared to similar systems on other micros, such as the Apple Mac and PC. It has been designed with the professional market in mind, and should prove a welcome addition for those wishing to increase their Arc's graphic capabilities.

Contact Irlam Instruments. 133 London Road, Staines, Middlesex TW18 4HN. Tel: (0895) 811401.

VECTOR RELEASE

HOT on the heels of Computer Concepts' ArtWorks comes 4Mation's Draw alternative, Vector. Written by Jonathan Marten, Vector contains all the features found in Draw, plus a host of enhancements.

Included among the new features is Path Merge which allows a number of lines to be merged into one, with moves separating each line. This is different to grouping lines and greatly reduces the amount of memory required.

A Replicate facility allows any object, or group of objects, to be repeated anywhere in a drawing. Rather than just making a copy of the object, Replicate retains only one description of the object, and uses tokens to represent the object elsewhere in the drawing. This greatly reduces the size of a file containing multiple objects. At the time of going to press, Vector was still undergoing development and so no price has yet been fixed. Contact 4Mation, 14 Castle Park Road, Barnstable, Devon EX32 8PA. Tel: (0271) 25353.

Rob Miller

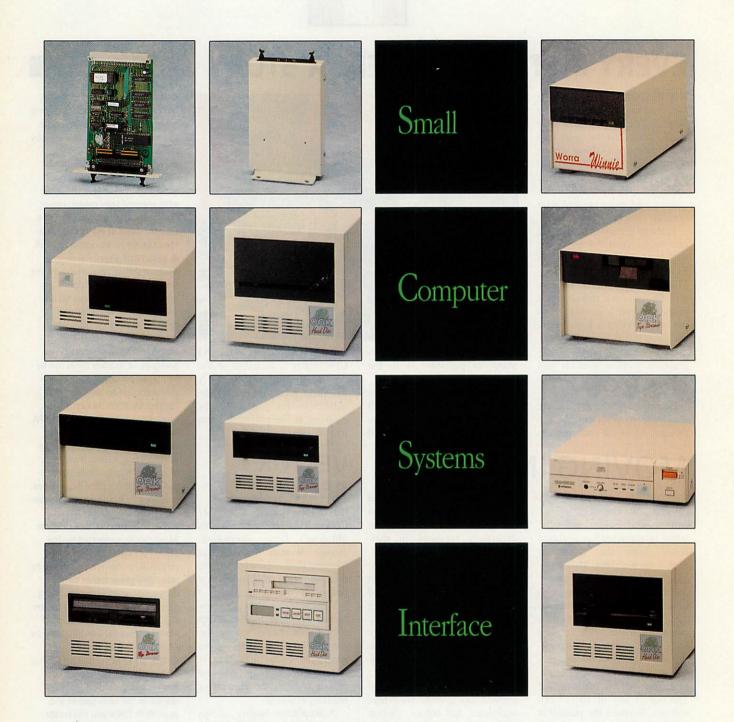
NEWS IN BRIEF

 DAVID PILLING, he of cheap (but remarkably good) software, has released his own sprite tracing program which allows any sprite to be converted into a draw file by replacing areas of colour by a draw path outline.

Due to the nature of the program, it is more suited to sprites with areas of solid colour, rather than those with a lot of dithering. Contact David at PO Box 22, Thornton Cleveleys, Blackpool FY5 1LR.

- 4MATION'S sprite animator Masque should be available by the time you read this. Designed mainly as an educational art program, Masque allows you to produce animations from your own sprites by moving (and scaling) them over a pre-drawn background. Tracker tunes can be be played simultaneously to provide a musical accompaniment. Contact 4Mation, 14 Castle Park Road, Barnstable, Devon EX32 8PA. Tel: (0271) 25353.
- POWERSHADE looks set to be the most comprehensive ray tracing program to be made commercially available for the Archimedes. Produced by Arxe Systems, Powershade will produce ray traced scenes in any mode, including the 24-bit modes supported by The Serial Port's graphics expansion card. A 3D editor will be built-in to make designing scenes simpler. Conversion utilities for importing files from other editors/ray tracers will be also be included. Contact Arxe Systems, PO Box 898, London E7 9RG. Tel: 081-534 1198.
- THE 3D Construction Kit for the Archimedes is now nearing completion and should be ready for release in the early part of this year. With 3DCK you can create whole worlds with different villages, towns or cities, all represented in solid three-dimensional graphics. Any area can be linked to another by a doorway, so it is possible to create rooms within a house, or even a Dr Who-like Tardis with many large rooms within a small box. Contact Domark on 081-780 2222.
- IF YOU have any news, hints or tips, or interesting images, send them in. We are particularly interested in the package you used and details of how the image was created. Write to: Rob Miller, Graphics Column, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.

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150 Mb	£1354.00

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Magneto Optical R/W Drive

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CD ROM

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Prices shown include SCSI interface. Always state computer type when ordering

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and VAT



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Genesis Plus

multimedia software is simply...









Genesis Plus creates linked pages of information which can contain text, graphics, music, speech and sounds. Genesis Plus has been designed to be easy to use for all ages, from primary school children to teachers, thereby opening opportunities for pupils, parents and teachers to use IT to aid the development of creative learning across the curriculum.

The program is fully multitasking and intuitive to use, frames are simply drawn on a page into which text can be entered directly or imported from any program which produces text files. Genesis Plus will also accept data in a wide variety of formats including scanned and digitised images, video camera output (via a genlock card or digitiser), drawfiles, Euclid files, Ace films and sound samples including those from Oak Recorder. Genesis Plus comes complete with full documentation for those who wish to explore the great potential of multimedia.

Genesis Plus works like a book in that a project can consist of one page or many pages. Each page can combine words, pictures, graphics, speech and sounds. These can all be linked to related pages of information as in a database, or the project can be viewed by flicking through in both directions as though it were a book.

Genesis Plus can also be used as a simple desktop publishing package, as it supports outline fonts, and has the ability to import scanned images to produce professional books, pamphlets, and magazines.

Genesis Plus differs from Genesis II in that while you can run applications written in the powerful Genesis II scripting language, you cannot edit the script language element of the applications. Genesis Plus includes sophisticated data compression which works automatically, enabling the user to store much larger files on floppy disc and removes the necessity for constantly changing discs.

Any existing Genesis projects can be converted automatically to run on Genesis Plus.

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Watch out for the March issue of BAU – available February 13 1992

PLUS

KARMA

It's ready...no it isn't...yes it is! *Flight Trainer*, the first part of the long-awaited space game, *Karma*, has arrived. We put it through its paces

NOTATE

If you want to turn your Arc music into score sheets, *Notate* from Longman Logotron is the answer. Find out why it could be music to your ears

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Why keep your text on the straight and narrow? We review several font applications that allow you to twist your words

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A3000s are likely to have an HCCS 3Mb RAM upgrade

1 in 36

A3000s are likely to have an HCCS User/Analogue podule

1 in 10

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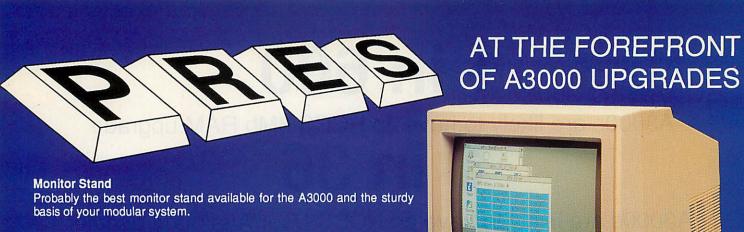
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STAR LETTER £15

I thought the following experience I have recently had with the Hard Disc Companion software from Beebug might be of interest to other readers, particularly if their system is fitted with a Computer Concepts Laser Direct Hi-Res printer as mine is.

Basically, both the Backup and Restore utilities from Beebug and the PrinterHR driver have in common, in name only, a relocatable module called Compress. This means that you cannot have both applications resident and operational in the system at the same time. Indeed if, like me, you finally manage to get the Backup utility to run by RMKILLing the PrinterHR compress module, then you must quit the PrinterHR driver. Leaving the driver resident and then attempting to print something, results in a severe system crash requiring a reset.

As my system is used regularly by inexperienced users it is not a situation I like to leave lurking on my Archimedes. I thought Acorn had guidelines and rules governing this use of module names?

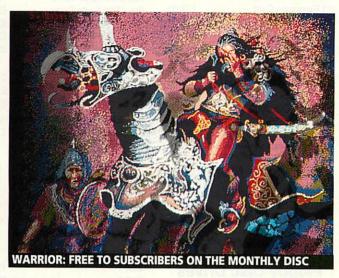
> Alan Stout Tetbury Gloucestershire

Acorn has records of module names, but only those which the third party developer have given. It does encourage Independent Software Vendors to use unique names to avoid such clashes, but some still slip through the net.

You will be pleased to hear that Beebug is aware of this problem and has recently upgraded its Hard Disc Companion. Among other things the upgrade has removed the need for the Compress module. Upgrades from the original cost £15 plus VAT. Risc Developments, which sells the new version, is on (0727) 40303.

ELITIST VIEWS

Over the last few weeks I have received a number of comments about my part of the Elite review (BBC Acorn User December 91). Some of these comments have been favour-



able, although many are of the opinion that I was too harsh.

I would like to point out that the criticisms I raised should be taken along with the heading of the piece: 'The Case Against...'. I believe that because Roger Hall wrote more of a review than 'The Case For...' many people think that my piece was also a full review and that I have a very low opinion of the game. This is far from the truth - Elite is Elite, and will always be a classic. In my piece I was trying to point out some of the ways in which the Archimedes version could have been improved. But then again, the game is called Elite and not Elite 2 so perhaps I was expecting too much.

Many thanks to David Braben, the co-author of the original Elite, for pointing out there are concave ships in the game, as in his original BBC version - I'd never noticed!

David Lawrence Canterbury Kent

... TO CATCH A CROOK

I have been thinking that as viruses become more common on the Arc simply writing inoculation programs may not solve the problem.

What about creating a virus to kill viruses? They would reproduce in the same way but would delete themselves after copying twice, therefore allowing an exponential population increase. Instead of having harmful effects themselves they would seek and destroy known harmful viruses. A friend suggested that there would be a problem when you wrote new versions as they would attack each other, but I regard this as ideal; only the best killers would survive! This will probably give rise to malign virus killing viruses, but I reckon this is an inevitable step as these things evolve.

Colin Turner Bangor N Ireland Even though this is a fasci-

nating idea we don't know of any recent new viruses. Perhaps this is to due to the new laws, or maybe the people who write them have finally grown up.

FONTS A LOT

I was most interested to read the article Character Reference (BAU November 91) on the subject of adding extra fonts. I use Acorn DTP and would like to be able to change or extend the range of fonts I can use. Your explanation of altering the configuration file is quite clear, as is the explanation of how font names from different sources vary.

However, what you do not say is whether a complete list of the standard font numbers (some of which are listed in the article) is available, and if so where can I get such a list?

> T Johnson South Normanton Derby

A full list of Venturer font numbers is only available in the Venturer manual.

THE PRICE IS RIGHT?

I have just read Graham Bell's article on the A5000 (BAU December 91). At the risk of upsetting those who regard the Archimedes with religious feryour, let's cut the hype.

To a PC user like me who has had a BBC Model B and who wants an A5000, it sounds a fine machine. Acorn will probably sell a few hundred thousand over the years. However more than five million copies of Windows 3 have been sold this year, so at least that many PCs run windows.

The A5000 is overpriced compared to a similarly-specified 386SX by about 20 percent, or £300. For A5000 money, PC buyers are looking at seriously powerful 386DXs with 4Mb Ram, 33Mhz chips and colour monitors that A5000 owners would love to have. With the current price war 486 PCs will be at A5000 prices soon.

Put bluntly, the A5000 is not competitive in price and performance. Acorn knows this and has always targeted niche markets too small for the PC manufacturers. As I want a computer for my young children, I will probably end up paying over the odds for an A5000 in order to use the education software. But if someone ever writes an Archimedes emulator for the PC then, bye bye Acorn.

> John Tebbit Headcorn Kent

Quality is sometimes a more crucial factor than price. You get what you pay for, John!

DISC DIRECT

I have just begun buying BAU from my local newsagents, but I can't yet afford a subscription. How can I obtain one of the programs so I don't have to type it in?

> John Adams Winchester Hampshire

Individual discs can be obtained from our mail order house using the form on page 81. However a subscription (see page 33) is a cheaper solution in the long run, as the discs come free!



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I have just ordered a new A5000 computer, but I now wonder if I will be able to use my treasury of older DFS format discs that I have built up since 1983. I know I can add 5.25in drives but will they read DFS? Perhaps I could use the serial link between the Archimedes and my BBC Model B?

> D. Lewin St Albans

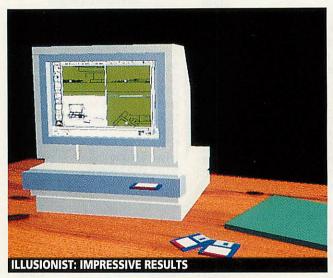
There are a number of disc utilities available to enable you to read BBC DFS discs on your new Archimedes. ArcDFS by Dabs Press (PO Box 48, Prestwich, Manchester M25 7HF) is a full implementation which will perform all the functions of DFS, including formatting and using a DFS Ram disc from within the Risc OS Wimp environment.

If you add a 5.25in interface, ArcDFS can also read and write to the additional drive. Before you can connect a 5.25in drive, you will need to purchase a suitable interface. Your local dealer can supply one of these for around £35. Alternatively, you can use the serial link to transfer software. The disadvantage is that you will need access to both the Archimedes and BBC in order to link them together. Again, Beebug can supply suitable software, together with a connecting lead.

I have recently fitted The Q Serial Port's graphics enhancer to my Archimedes and wondered if there is any software available that can take advantage of the extra colours provided?

> **Steve Pratt** York

QUESTIONS ANSWERS



Since the Graphics A Since the Enhancer was launched a number of software houses have considered the option of modifying existing programs and adding support to future programs. Minerva and The 4th Dimension are two companies who seem particularly interested in the added realism that 24-bit colour has to offer. Clares Micro Supplies has already produced Illusionist, its 3D rendering package offers full support for the produces enhancer and impressive results.

I am trying to get to grips with using outline fonts on my A3000. I have managed to print text in various colours using SYS commands but cannot manage to change colour within a string. Is there any way I can insert control codes into a string of text to change the colour? I have tried the following line which just produces the numbers on screen;

Stext="Hello 17,40

my name is Graham"

Graham Conridge Bedford

The problem really A stems from how you control the colours used for anti-aliasing the fonts. Obviously if you want fully antialiased fonts in a 16-colour mode you will only be able to use one colour (in 16 shades) effectively. If you only use one colour for the fonts, they may look slightly more jagged around the edges but will allow you to use multiple colours on screen at once. The program in figure one demonstrates this.

Line 20 allows you to enter your text. Inserting CHR\$(17), followed by a character between one and seven allows you to change colour in this case green (colour two). Lines 30 and 40 will look for the font and set it for future font operations, while line 50 sets up colour eight to be used as a font colour (see page 1460 in the PRM). Line 60 plots the line of text on the screen at coordinates 100,100. modifying this code slightly it should be possible to turn it into a procedure for inserting into your own programs.

I have been using Maes-tro, supplied with my Archimedes, which I find very useful for musical compositions. However, I find the range of internal sounds rather limited. I have EMR's Creations disc of additional instruments, together with a percussion module.

I cannot seem to get Maestro to recognise any of the new instruments which I have loaded by typing *RMLOAD <module>. Am I doing something wrong and is there an easy way to convert EMR Soundsynth files into relocatable modules?

> M. Locke Crewe

A In order for the Archimedes to recognise a file as being a sound instrument, any sound samples have to be created as a relocatable module, which includes various information at the beginning to tell the computer that what follows is a sound. EMR's creations discs, together with Sound-Synth itself, are in a slightly different format, which requires some additional commands to be issued before Maestro will recognise them. First, you will need to locate and load EMR's WFS module, which is supplied with SoundSynth. Having installed this, you need to load your sound samples via the WLoad command.

For example, if you have two modules called Piano and Harp you can load them by typing the following

10 REM > FontDemo

20 MODE 12

30 text\$="HELLO THERE "+CHR\$(17)+CHR\$ (1) + "PAUL"

40 SYS "Font_FindFont", 0, "Trinity. Med ium", 36*16, 36*16, 0, 0 TO handle

50 SYS "Font_SetFont", handle

60 SYS "Font_SetPalette",,0,8,0,&0000 0000.&FFFFFF00

70 SYS "Font_Paint", handle, text\$, &14,

FIGURE 1: CHANGING FONT COLOURS

commands:

*WLOAD Piano

*WLOAD harp

*WINSTALL

The *WINSTALL command will install the samples as valid modules in your computer. You can then select them as normal instruments, using Maestro. Note that some very long samples may need extra space allocated to them via the *WADDRESS command. You should consult the SoundSynth manual for a more detailed description of this command.

I have found times when I move the I have found that somemouse around, the pointer does not always go in the direction I want. Could this be a fault with my mouse or does it just need cleaning?

> Rachel Bidwell Clapham

First, it is worth check-A ling to see if the lead is plugged into the computer correctly, as spurious pointer movements can sometimes be caused by bad connections in the socket. The mouse can also pick up bits of fluff and dust which can make the plastic ball become smoother and prone to slipping. The cure for this is to carefully remove the ball by unscrewing the small screw holding the clip. Wash it carefully with warm, soapy water. Sometimes leaving it to soak over night can help. Dry and replace the ball, which should then make better contact with the spring rollers inside the mouse.

I have a BBC Model B Q I have a DBC which has recently been until used mainly for games up until now. However, I now have a need for some wordprocessing ability and want to know if such facilities exist for the BBC or is it time to upgrade to a more powerful machine?

Andrew Brown Market Harborough

A First, the BBC Model B is fully capable of quite powerful wordprocessing capabilities. However, you need to consider how much burden is likely to be placed on your computer and, if as a side effect of doing wordprocessing, you are likely to need more powerful applications in other areas, such as databases and more elaborate desktop publishing (DTP) uses.

Two powerful wordprocessors exist for the BBC B; Wordwise and View. Both offer a host of advanced features and are available in varving incarnations. depending upon what peripherals, such as hard discs and printers, have been added to your machine.

One of the main differences is that View offers 80 column editing, which means that what you see on the screen is what gets printed on your printer.

Wordwise, on the other hand, shows the text in the easier to read Mode 7 display and only converts to an 80 column display when you 'preview' the text. A more advanced version of Wordwise, called Interword, is also available, which is highly recommended for the additional money. A decent local dealer should be able to show you both running, to help you make up your mind.

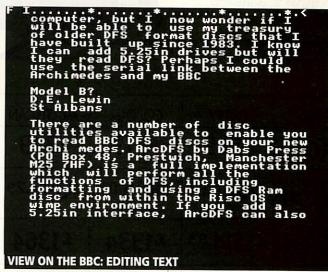
I have Impression Junior and about five discs full of different fonts. Is is possible to load all the fonts at the same time?

> Ashley Cox Berkshire

Yes you can - although A Yes you can to gain the full benefit of multiple fonts you should install them on a hard disc. The way to do this is to create a !Fonts directory. You may want this to go in your root directory, if it is frequently used.

The easiest way to achieve this is to 'drag' the !Fonts directory from your original Impression disc into your hard disc directory window. Next, open the !Fonts window by double-clicking the left mouse button on it while holding down the SHIFT key. Do the same to your first font disc.

Each of the fonts on your font disc will be contained



within its own directory, for example; Trinity, Corpus and so on. Simply drag each of these directories from your floppy disc on to your newly opened hard disc directory. Repeat this for each font discs. Now, each time you load !Fonts, all fonts will be present for use.

One side effect to note here is that some packages (such as Edit) don't like too many fonts being present. The way around this is to use the technique described in last month's column.

I have just bought a second hand disc drive for my BBC Model B. I wish to connect it to my existing drive, which already has a dual cable on it. Can I simply plug the new drive in, or do I have to change any links inside the drive first?

> John Fairweather Chelmsford

A It is quite likely that both drives are set up to behave as drive zero. This means that if you connected them together each would 'argue' as to which was in use. To avoid this you must change a drive select link in the second drive to select it as drive one. The links are usually a small bank of dip switches or dil sockets and labelled ds0, ds1, ds2 ...

The second thing you need to do is to remove the termination resistors in the drive half-way down the cable, so that only the drive at the very end of the cable contains them. These are usually very close to the actual ribbon cable socket on the drive PCB and look like a small black IC with grooves on its side. If unsure, your local dealer should be able to help.

Make sure that power is disconnected while you perform this task.

HELP US TO HELP YOU

The Questions and Answers page is your chance to have your problems solved. It can be on any topic - you name it and we'll try to solve it. Please send your questions, whether technical or otherwise, to:

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★ SVHS Upgrade to techno-I

★ Canon ION CCD Camera and accessories

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All prices ex VAT. Prices are subject to change without notice. Please add carriage (a) £8.00 (Courier) (b) £5.00 (c) £2.50 (d) £2.00 (*) Courier included

techno-I

The techno-I Real-Time Colour Video Digitiser for Archimedes computers is one of the most advanced video digitisers available, with features found only on topof-the-range models for the IBM PC.

The techno-I card, with RISC OS multitasking software, allows you to grab a picture from a video source (TV, Video recorder, etc.) and convert it into a sprite. This can then be dragged to RISC OS applications such as art or DTP packages.

Unlike simple RGB video digitisers, techno-I handles colour in 25 bits with 7 bits luminance and 18 bits chrominance. By manipulating the image using hue, saturation and luminance, it mimics the human visual system. The colours are therefore truly WYSIWYG. techno-I will also give true monochrome representation of colour images.

The on-screen viewfinder displays live colour or monochrome in real-time. The viewfinder can be either 1/16 or 1/4 screen area, and can be offset vertically and horizontally under user control.

The frame buffer resolution is up to 512 by 512, with programmable vertical and horizontal resolution. Complex frame manipulation features are built into the hardware including options to grab the current frame or previous frame and grab the last completed frame.

All viewing, video and digitising parameters are software controlled, there are no presets, no setting up, simply connect to a video signal, load the software and digitise!

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Tracker Ball - new low price

Taxan 795 Flatscreen Multisync with

with stereo sound

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Hi Res monitor

techno-I features include:

- ★ 25 bits resolution, 7 bits luminance and 18 bits chrominance
- ★ Contrast, colour and brightness set from Desktop
- ★ Image scaling up to 1280 by 1024
- * Selectable or automatic monochrome/colour digitising
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- ★ SVHS input upgrade available

"a big improvement on the best available from previous digitisers" Trevor Attewell, Archimedes World

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Interactive help and a superb manual.

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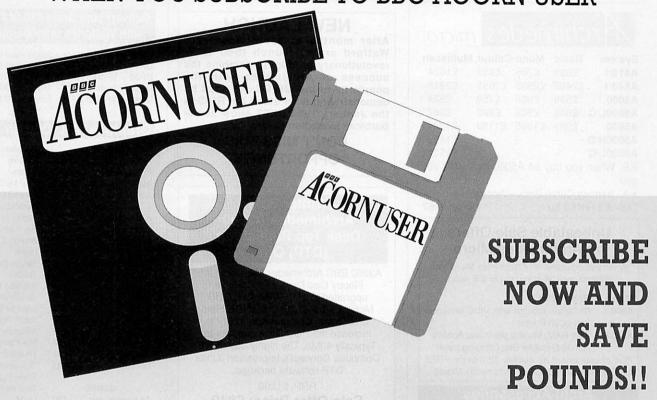
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E-Type

Olympics

Pirate

Pipe Mania

Power Band

Puncman 1 & 2

£27	QEEM 386	£59
£22	Rainforest	£17
£16	Revelation	£58
£39	Rhapsody in Blue 2	£45
£16	Show Page	£127
£15	Speech!	£15
	The Victorian	£17
£19	Time Tabler	€549
£14	Toolkit (Clares)	£35
	£22 £16 £39 £16 £15	£22 Rainforest £16 Revelation £39 Rhapsody in Blue 2 £16 Show Page £15 Speech! The Victorian £19 Time Tabler

£17

£16

£18

216

Touchtype

Tracer

Tracker

Vox Box

WorldScape

£40

£46

£39

£47

£17

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided.

P.S. A310 upgrades require a backplane and a fan. • 3HDP - Hard Disc Podule only

• 3HD20 – 20Meg H' Disc + Podule for 310 • 3HD40 – 40Meg H' Disc + Podule for 310 • 3HD50 – 53Meg H' Disc + Podule for 310 £235 £345 €474 • 4HD20 - 20Meg Hard Disc for 410 £129 • 4HD40 - 40Meg Hard Disc for 410 £215 • 4HD50 - 53Meg Hard Disc for 410 £335 A3000 20Meg Hard Disc + Podule £299

For Archimedes IDE Hard Disc turn to page 14

£429

A3000 40Meg Hard Disc + Podule

Desk Top Publishe	r
Acorn's Archi DTP Package	£108
Equasor	£39
Impression 2 DTP Pack	£130
Impression Junior	£72
Expression-PS	£19
Tempest DTP Package	£90

More Archimedes Products See Pages 3, 5, 6, 8, 10, 14

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Maste	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus - 2	£63	EasiWord	£18

Databases

AlphaBase	£36	Magpie	£40
Knowledge Orga	niser£42	Multistore v2.01	£185

Spreadsheets

Intersheet Disc	£24	Schema	289
Viewsheet	£45		

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

Logistix	£79	• Pipedream 4	£149

•	Desktop Office - Database, Graphs &
	Charts, Wordprocessor Spreadsheet,
	Communications

Desktop Folio - Wordprocessor, Desktop & Interactive Publishing. Ideal for school

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs

Features • An 8 I

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes
- I/O podule.

 An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes.

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Profes	sional		£275
Realtime Solids	Modeller		£136

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. New RISC OS Version Only £15

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead. A300/A3000 £21 • A400

Watch this space for our Low Cost - High Performance 4Mb and 8Mb RAM Upgrades for the A5000

LANGUAGES (Archimedes)

ISO-PASCAL; FOR			7 each
Assembler; LISP; I	Prolog	X £14	9 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	260	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	€69	Risc FORTH	£110



£98

256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.

256 Grey-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3mS per line! (Twice as fast as most scanners.)
- Selectable 256/16/4 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- Five-function edge detection software, Laplace convolution matrix image enhancement, image smoothing, etc.

Special Launch Price £185

ULTIMUM - Archimedes A3000 **Podule Racking System**



THE ONLY LOGICAL WAY TO **EXPAND YOUR A3000 COMPUTER**

Price: £149

Minerva's Archimedes Software

EasyWord	£18	Mailshot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	250		

System Delta Program Reference Manual * Requires System Delta to operate

Stand alone Business Accounts Packages Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management

£79 per module

or Complete Business Package £325

ARM 3 Turbo Card

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro

by a factor of 3 to 6. Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

In response to many of our customers requests, we have extended the Offer Price to 28/2/1992

RRP £249

Offer Price £199

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER £399 (see below)

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during January

Add-Ons & Accessories

Econet Module for the Master	£45
Twin ROM Cartridge for Master	29
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & N	Master £238
Morley Teletext Adaptor with ATS Ro	m £99
Ecolink	£270

Z88 Portable Micro



£179

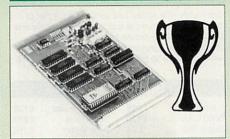
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

788 ACCESSORIES

	and the second s
• 32K RAM Pack or 32K EPROM F	ack £16
• 128K RAM Pack or 128K EPROM	/ Pack £32
512K RAM Pack	€86
 Z88 Eprom Eraser Unit 	238
Z88 Spellmaster for Pipedream	€40
Z88 Carrying Case	82
Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
. Battery Charger Compact & Fast	26
Z88 Serial Printer Cable	83
Z88 Parallel Printer Cable	£18
Z88 to Archi Link	£15
• Z88 to BBC Link £8 • Z BAS	SE £56
● Z88 to PC Link II £27 ● Z TAF	E £42
● Z88 to Macintosh £32 ● Z TEF	RM £42
• 788 Maine Adaptor CO • 788 M	Andem C114

Archi Real-Time Digitiser



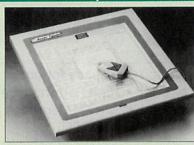
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £139

A Set of Colour Filters for colour image grabbing £16 using a video camera

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear

Graphic for use in Education). (FREE this month, PC Mouse Drivers & Art package)

Special Price £175

(Price includes Tablet, Leads, Software & Puck) Stylus Optional Extra £15

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £110

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints.



scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2

Acorn & Watford DFSs

Watford sophisticated DFS ROM	£16.00
Watford DFS Kit complete	£69.00
 We will exchange your existing ROM for 	
Watford's ultimate DFS ROM at only	£12.00
DFS Manual (comprehensive)	£6.95
Acorn DNFS ROM	£17.00
Acorn ADFS ROM only	£25.00
Acorn 1772 DES BOM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible Use ADFS on our DDFS board.
- Tube host Code No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing no need to fuss with 40/80 track switches (even works with protected disks)
- An extremely powerful 8271 emulation -
- ensuring compatibility with almost all software. New low profile small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations - BPUT and BGET.
- Operates in both single and double density
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk - Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only £39.00.

SPECIAL PRICE

 DDFS Manual (No VAT) £6.95

 We will exchange your existing DFS Kit for our sophisticated DDFS for only £30. £30.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.



3M - Diskettes

3M - SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• 10 x 5.25" S/S D/D 40T (744)	£5
• 10 x 5.25" D/S D/D 40T (745)	£5
• 10 x 5.25" S/S D/D 80 Track (746)	£7
• 10 x 5.25" D/S D/D 80 Track (747)	£7
• 10 x 5.25" 1.6M D/S D/D High Density for	r IBM
XT and AT	£9
• 10 x 3.5" S/S D/D 40/80 Track	£7
• 10 x 3.5" D/S D/D 40/80 Track	£7
• 10 x 3.5" Double Sided High Density	£13



Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● 10 x M3 3.5" D/S D/D 80 Track	£7
● 10 x M9 3.5" D/S High Density	£12
● 10 x M4 5.25" S/S D/D 40 Track	£5
● 10 x M5 5.25" D/S D/D 40 Track	£5
● 10 x M7 5.25" D/S D/D 80 Track	£7
● 10 x M8 5.25" D/S H/D Hi-Density	£9
M2 3" Double Sided	£2.50 each



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.

Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

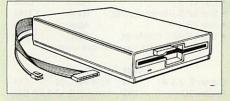
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

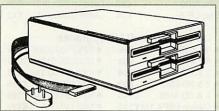
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges.

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without	PSU
• CLS400S:	Single, 40/80 track 400K Double sided Drive	£70
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives	£138
	Disc Drive with PS	U

• CS400S: Single, 40/80 track, 400K

Double sided Drive £80

• CD800S: Twin, 40/80 track, 800K

£153 **Double sided Drives**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes
- A comprehensive DFS Operating manual Bargain at Only £116 (Offer valid until stocks last)

3.5" DISC DRIVE



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• CLS35:	Single Disc Drive, 400K	£62
• CLD400S:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• CS35:	Single Disc Drive, 400K	£83
• CD35:	Twin Disc Drives, 800K	£126
(P.S. CS35 is s	upplied in a twin case with a	
blanking plate t	o enable easy expansion to	a dual
drive at a later	stage)	

Disc Drive Sharer



(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with

Price includes 3 Cables

Disc Drives in Monitor Stand



 CDPM 800S - Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

 DP35 800 – Same as above except, one disc drive is a 5.25" and the other is 3.5".

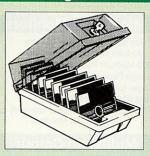
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



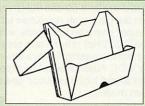
Gives double protection – Strong plastic case that affords real protection to your discs.

Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

•	M35 - holds up to 50 5.25" discs	€4.95
•	M85 - holds up to 95 5.25" discs	£6.95
•	M25* - holds up to 25 3.5" discs	£4.95
•	M50 - holds 50 3.5" discs	£6.50
•	M10 - holds 8 of No. 10 Data Carti	ridges £15
	* N	ot lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs. Holds up to 10 x 5.25" Discs. £1.50 £2.00

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

€4

Special Bulk Offer on Discs

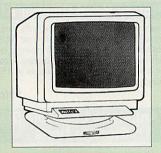
(Supplied packed in Anti-Static Lockable Storage Units) (Lifetime warranty on Discs)





BULK PACK DISCS in lots of 100

	S/S	D/S	D/S
Туре	40T	40T	80T
• Without Sleeves 5.25'	£30	£35	£40
With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D £2	7 for 50	£49 f	or 100



Microvitec Monitors

• 1431 - Standard Resolution Monitor	£169
1451 - Medium Resolution Monitor	£209
Cub3000 Medium Res for A3000	£189
• 1441 - High Resolution Monitor	£359
Dust Cover for Microvitecs	£5.50
Touchtec 501 Touch Screen	£239
	Charles and the second

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	NEC 6FG	£1525
• Eizo 9070S	£579	Taxan 770LR	£362
NEC 3FG	£370	• Taxan 775	£362
NEC 4FG	£465	Taxan 795	£402
NEC 5FG	€850	• Taxan 875	£669
 VIDC Enhance 	er Board		£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes. £325

Philips Monitors

£67
£67
£165
£6

STAR BUY

• PHILIPS 14" Medium Res, dark glass, attractively finished Colour Monitor. A pushbutton switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £163

Refurbished Monitors

ar.	fillips 14 helurbished Colour Morillors,	
	same specification as the 'Star Buy'	
	Monitors above	£119
Š	(Offer valid while stocks last)	

Spare Monitor Leads

Optio monitor -	- Cuu
BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Aries 2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video output. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

A bargain at £159

Watford VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control

MultiVideo VIDC Card: As above but for MultiScan

monitors only.

Panasonic Printers



• KX-P1123	£130	• KX-P1654	*£335
• KX-P1124i	£176	• KX-P1695	£274
• KX-P1170	£100	• KX-P2624	*£350
AVV DICOL	0074		

* Price includes 12 months On-site warranty

Cut Sheet Feeders

P36 - 1124/24i £79	P37 - 1123/70/80	€69
P38 - P1624/95; P2624		£129
Buff	ers	
P12 4K Buffer Board for	KX-P1081	£55
P14 32K Buffer P1123/24/	70/80	

P12 4K Buffer Board for KX-P1081	£55
P14 32K Buffer P1123/24/70/80	
P1540/92/95; P1624/54/95	£16

Serial Interfaces

P19 for P1123/24/24i/70/80/1624/54/95/2624

Citizen Printers

• 120D Plus	£100	• 124D Printer	£145
• PN-48	£209	• Swift 24E£24	
• Swift 9	£145	Swift 24X	£299
Citizen 224	£185		
· Prodot Cut Sh	eet Feed	er	£120
• PN48 Ribbons	3		£3.50
• Swift 24 Color	ur Option		£29
Swift 24 Ribbo	ons Bla	ck £4 Co	lour £13
• Swift 24X Cut	Sheet Fe	eder	£125
		our Printer Driver	£15

Integrex Colour Jet

Colour Jet 132 Printer	£469
Paper Roll	£6.50
BBC Screen Dump Software	£10
Colour Cartridge	£21
Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
8K Serial Interface Optional	£123

Star Printers

		the latest	All residence in the last
• LC15	£173	SJ48 Inkjet	£175
• LC20	£103	• XB24-200 Colour	£299
• LC24-10	£137	• XB24-250 Colour	£359
• LC24-15	£240	XB24 Colour kit	£29
• LC24-200	£168	ZA200 Colour	£236
• LC24-200 C	olour£207	• ZA250	£299
• LC200 Colo	ur £146		

Star Accessories

Cut	Sheet	Feeder	
LC10/200/24-10	£65	LC15/LC24-15	£1

ADZ4 I	LOG ABLATO	2.00
	Serial Interfaces	
8K Ser	LC-200; LC24-200; FR10; FR15	5;
	XB24-10; XB24-15	£55

Paper Roll Holders LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6		
LC-200; LC24-200	Black £5;	Colour £12		
XB24-10; XB24-15	Black £5;	Colour £12		

Laser Printers

All Laser Printers include 12 months On-site maintenance

Canon LBP-4+	4ppm	£575
Canon LBP-8 III	8ppm	£970
Canon LBP-8 IIIR	8ppm	£1445
Canon LBP-8 IIIT	8ppm	£1345
Epson EPL4100	6ppm	£569
Epson EPL7500	6ppm	£1165
HP Laserjet III	8ppm	£1015
HP Laserjet IIID	8ppm	£1720
HP Laserjet IIIP	4ppm	£705
HP Laserjet IIIsi	16ppm	£2695
Panasonic KX-P4420	8ppm*	£620
Panasonic KX-P4450i*	11ppm*	£930
 Panasonic KX-4455 Postscr 	ipt 11ppm*	£1455
Panasonic KX-P4430 Satin	Print	2POA
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£915
Star LP-8 Star(post)script	8ppm	£1149
Star LP-4	4ppm	£565
Star LP-4PS Postscript	4ppm	£779
* Now with 2 years On	cite warrant	V

Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	KX-P4420/50	£19
Epson GQ	£13	Laserjet HP IIP & IIIP	£42
EPL7100	£82	Laserjet II/D, III/D	£48
Star LP-8	£56	Qume Crystal (3)	£42

Lase	r RAM	l Upgrades	
• IIP & III 1MB	£56	 EPL7100 256K 	£39
• IIP & III 2MB	883	• GQ5000 512K	£42
• II & IID 1MB	£64	• KX4420/50 1M	£75
• II & IID 2MB	£99	• KX4420/50 2M	£115
• II & IID 4MB	£146	• KX4420/50 4M	£195
• Canon LBP4 1M	£105	Star LP8 1M	£139
• Canon LBP8 2M	£125	Star LP8 2M	£275

Laser Drum & Developer

 Epson Drum 	GQ5000	£93	EPL7100	£129
• Panasonic 4420	Drum	€60	Developer	£59
 Panasonic 4450 	Drum	£93	Developer	083
Qume Drum		£76	Developer	£56

Jetpa	ge Posts	cript Cartridg	е
HP IIP/III	£239	IID & IIID	£240

Various Add-Ons

aserjet Appletalk Interface	£139
HP Adobe Postscript	£399
Jetpage Postscript for Laserjet 2P	£235
Jetpage Postscript for HP 2P/3	£229
Pacific Page Postscript	£259
HP Premier Font Collection	£28
Jetfont Superset for II & IID	£129
JF Superset International for IIP & III	£145

Hewlett-Packard Printers

• # Desk Jet 500	£299	Paintjet XL	£1089
 Desk Jet 500 Col. 	£481	Quiet Jet Plus	£384
 Desk Jet Cartridge 	£14	 HP Think Jet 	£265

• Paint Jet Colour £435

Now 3 years extended Parts & Labour warranty

 Paintjet Cartridges 	Black	£19;	Colour	£25
 Desk Jet 500 256K R. 	AM cartr	idge		£129
• HP Epson FX Emulati	on Cartr	idge for	Desk Jet	259
Desk .let Unlimited (B.	ook No	VAT		£19 75

Canon Bubblejet Printers

			D'ble	Ink
	Printer	CSF	Bin	Cart
BJ10EX	£192	£43		£16
BJ300	£340	£88	£65	£12
BJ330	£385	£110	£79	£12
• Spare E	attery pac	k for BJ10E	STATINGS	£33

NEC Pinwriter Printers

• P20	£180	• P70	£425
• P30	£240	• P90	£635
• P60	£335		

Cut Sheet Feeders

P20 £59; P30 £75; P60 £85; P70 £129

Epson Printers

DFX5000	£1079	LQ1060 Colour	£599
DFX8000	£1979	LQ1070	£319
FX850	£268	LQ1170	£438
FX1050	£340	LQ2550+	£679
LQ200	£155	LX400	£102
LQ450	£172	LX850	£142
LQ570	£210	LX1050	£208
LQ860 Colour	£449	SQ850	£432
LQ870	£368	SQ2550	£625

Cut Sheet Feeders for

LX400/800/8	350/LQ400	/500/550	£69
EX800/FX80	00/850/LQ8	300/850	£130
FX/LQ 1000	/1050/SQ8	50	£159
LQ 2550	£390	SQ2550	£390

Tractor Feed for

LQ800 £44; LQ850/FX850 £69; LQ1050/ FX1050 £85; LQ2500 £90; LQ2550 £90.

Accessories

EX800/1000 Colour Option	£45
• EX800/1000 Colour Ribbon	£14
LQ2500 Colour Option	£65
 Multifont Card for LQ550/850/1050 	£95

Epson Printer Interfaces

All the	ese interfa	aces fit inside the printer	
RS232	£28	RS232 + 2K Buffer	£52

Printer Leads

£5
£7
£7
26
£4
£10
£15
£7
63
£12
P.O.A.
£5

Concept Keyboards

Ctandard At Kauba and with BBC Caffeers	04.40
Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

Plotters

• HP7440A	£415	• HP7475A	£592
	Roland	Plotters	
● DXY1100	£495	• DXY1200	£625
• DXY1300	£825	• DXY2500	£2345
• DXY3500	£2955	 Sketchmate 	£310
 Roland plotte 	er Pens. Fib	re tip	£7.50

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
2,000 Sheets 9.5" x 11" Fanfold Paper	£11
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
1,000 Sheets 15" x 11" Fanfold Paper	29
2,000 Sheets 15" x 11" Fanfold Paper	£16
• 1,000 Sheets true A4 Fanfold Paper 70gms	£11
2,000 Sheets true A4 Fanfold Paper 70gms	£21
Teleprinter Roll (Econo paper)	€4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	26.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	£13.50
3000 70 x 37mm (3 Rows)	£13.25
2625 70 x 42mm (3 Rows)	£13.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	_	£3.50
BBC Master	_	£4.00
Archimedes Micro pair		29.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
DMP4000	£3.75	£4.85
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	
FX/MX/RX100/1000	£3.95	-
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	26.00
LQ1050/LQ2500	£4.00	
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	25.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.00	€5.00
Star LC24-10	£2.95	26.00
Olivetti Ink Jet		
Cartridges (set of 4)	26	

Original Panasonic Ribbons

	Guaranteed to	last 3	3 millio	n characters	
P110	for KX-P1081,	1592	& 159	5	26
P115	for KX-P1180	£7	P145	for KX-P1124	£7
P140	for KX-P1540	83	P155	for KX-P1624	83
Color	r Dibbons for K	V DI	11 100	00 9 1505	

Brown, Blue or Red £9 each

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your required for your printer functions is

effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3) 132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 5 to 1	£16	£17

Professional Tyne

		the state of the s
Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38
Cab	les extra at £6 e	ach

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa. Parallel £18; Serial £17 (Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1		689

256k Multi Spooler

These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

• 2 ln/2 out	£135	• 4 ln/2 out	£169
• 8 In/1 out	£199		

Compact Converter Units

Serial to Parallel £36 Parallel to Serial £37

Laser Direct



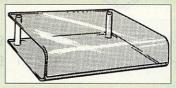
 Laser Direct Qume 6ppm complete £779

 Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £325

 LPB 4 Printer plus High Res Card £899

• LPB 8III Printer plus High Res Card £1299

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version £16 (carr £3) 136 Column version £20 (carr £4)



Quest Mouse III & Quest Paint	£59
Quest Mouse III, Quest Paint, AMX	
Stop Press & Pagefont	289
Quest Mouse III only	£30
Quest Paint Software only	£34
Quest Font Disc (22 Text Fonts)	£15
Quest Mouse Mat (Red or Blue or	
Green please specify)	£3
 Quest Colour Dump Disc – This new software allows you to print direct from 	
Quest Paint to your Integrex Colour	
Printer	£18
(P.S. Quest Paint is not compatible	

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

with BBC Compact)



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30 (Price includes software in ROM and a comprehensive Manual).

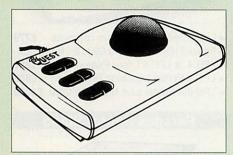
(Not Compatible with BBC Compact)

ARCHI MK II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest - Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version £25 QT-20 Archimedes Version £26

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£36
RB2 including Quest Paint	£69
RB2-A for Archimedes	£37

THE NEW Mk III AMX MOUSE

AMX Mouse plus Super Art £54

(Please specify for BBC, Master or Compact)

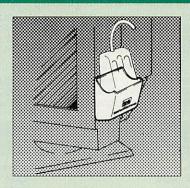
AMX MOUSE ONLY	£29
AMX SUPERART Package	£29
AMX STOP PRESS – A Desktop	
publishing software. Works with	
Keyboard, Joystick or a mouse	£25
PAGE-FONTS - Over 20 Fonts for	
use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£34

• AMX XAM Educational £15

• AMX EXTRA EXTRA £16
• AMX MAX A gem of desktop (ROM) £20

• MOUSE MAT £3

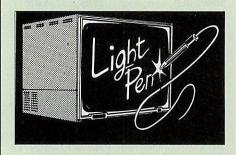
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or dock.

It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £3



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

Fleet Street Editor

Software pack for BBC Compact	£22
Fonts N Graphics Disc Utility	£13
XTRA Admin	£12
Walt Disney	£12

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware

£125



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be — it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack £59
Wapping Editor plus Mouse £79

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor. Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create

extra smooth headlines.
Supplied complete with instructions.

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

Archi A4 Scanner



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the IHELP application on the Acorn applications discs.

x and Y directions, saving and printing of the sprite created. Interactive help is supplied using the IHELP application on the Acorn applications discs. The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control

achieve optimum image clarity.

Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

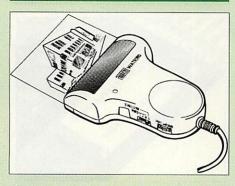
New Low Prices:

Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419
(Dealers Inquiry welcome)	

Computer Concept Scanlight

A STATE OF THE PROPERTY OF THE	Name and Address of the Owner, where the Owner, which is the Owner,
Scan-Light A4	£375
Scan-Light A4 + Sheet Feeder	£475
Scan-Light Junior mono	£178
Scan-Light Junior 256	£215

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multitasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting. X and Y flip.

Edge detection which turns solid objects into outlines.

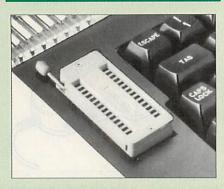
Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version £149
AHS-3 Archi A3000 Version £169

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required.
 The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- . BBC, B and B+ compatible.

ONLY £18

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

Complete System £11Spare Cartridges £2.75

Spare Rack
 £1.65

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin £8; Quad £13

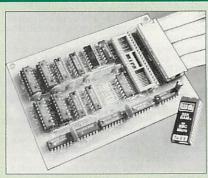
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at £22

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free
 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- printer buffer can be used with Wordwise & WW+
 due to the way they are written).

 Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)



Commander Joystick



Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

Direct connection to BBC Analogue input port —

no interface needed.

• Fully compatible with all BBC Joystick controlled games programmes.

 Switchable springs allow selection of floating or centring operation.

 Trim adjusters for both X and Y axes for fine centre adjustment.

 Convenient stick mounted fire button with additional base buttons.

Price: £15



ARIES

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

as sideways HAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

scientific user gets access to a massive 4 rX roll data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer

buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

 Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: £59

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal

cost Price:

Aries B-12 £36 Aries B-12C £5

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

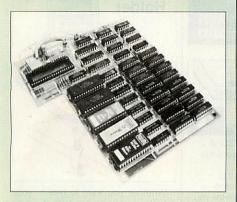
voitinace obysticks		
Delta 3B Single Joystick	£10	
Delta 3B Twin Joysticks	£15	
Delta 3C Joystick for Compact	£10	
Delta 14B Single Joystick	£11	
Delta 14B/1 Adaptor Module	£12	
ransfer Software Disc-Tape	£7	
Delta-Cat A mouse eliminator Joystick		
or the Archimedes	£24	

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

	PRICES.	
•	ROM/RAM card with 32k DRAM	£4
•	ROM/RAM card with 64k DRAM	£59
•	ROM/RAM card with a massive 128k	
	DRAM	£99

OPTIONAL EXTRAS:

- Tolk plug in Otatio To the fac	~~
16k DRAM for Upgrade	£13
Battery backup	£3
Read and Write protect switches	£2 each
Complete ROM-RAM card with all options	

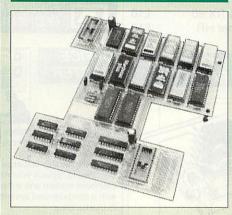
fitted



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

CR

Solderless Sideways ROM **Socket Board**



The key features of this no fuss, easy to install card

- Increases your BBC Micro's ROM capacity from 4 to 16
- No soldering required.
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35 Battery Backup fitted £39 Battery Backup only £3 16K Sideways RAM £8

 Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

£20.00

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs.
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00 POLYMERS O-Level program. Classification & Periodic Table O-Level. The
- suite is supplied with its own database of chemical elements which can be classified according to your own rule.

ADVANCED TELETEXT SYSTEM	£8.65
PERIOD TABLE SOFTWARE	£20.00
Computers at Work – Primary	£17.35
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Electric Fields 6-14 years	£11.25
Espana Viva – 3 Discs	£19.95
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· French Programs with Henri Beret - The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16

Six German Games - Aimed at pupils in their first year, but useful as revision for more advanced student of German, 12 years+

More German Games - Aimed at pupils in their 2nd year of learning German. 12 years+

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Wordwise	£24

Wordwise plus

£40

We are giving away absolutely FREE, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Rid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key
- Search and display in preview mode. Embedded command removal.
- Print Multiple copies of a document. Multiple file options for print and preview.
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- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area. BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc interface in your Micro)

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disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or	Compact
View-Index	£12
Overview packs 1 & 2	£65
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MINI OFFICE II

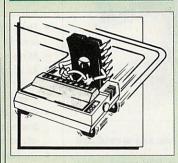
DISC Version for BBC	
B & B+	£14.00
DISC Version for BBC	
Master	£16.00
DISC Version for the	
Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

View Printer Driver **Discs**

Epson FX & RX 80 £10 £10 Juki & Brother HR

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100,

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29



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STOCK CONTROL - Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier

All this for only £21 (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE - Set up a computerised card index system with powerful search facilities.

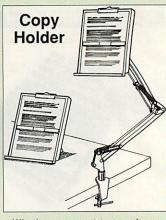
SPREADSHEET - Offers many calculation and editing features

BEEBPLOT - Provides visual representation from Spreadsheet data.

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Acorn Speech Synthesizer package complete, for the **BBC B Microcomputer**

Special Offer £14



Whether you want to type in your latest program or the draft of a new trilogy. Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

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The Epson RX/FX/KAGA **Printer Commands Revealed Handbook**

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities - he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE FX-KAGA **EPSON** PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

ALL PRICES EXCLUDE VAT

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Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory? 'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way - from Acorn to MS-DOS, or from MS-DOS to Acorn. 'ACORN TO PC' also acts as a handy

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material. Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc. and Networking Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work - even giving advice on writing and marketing your own programs

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

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The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

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Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed. Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

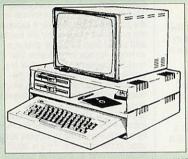
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$

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Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

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Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user. Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application

powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The IIDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data. deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- IIDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock

*IDEUnlock

! DEFS Selects the IDE filing system 'IDEFS'.

'IDEDrives Displays the configuration and native

characteristics of installed drives. Configure IDEFSDirCache

Configure IDEFSBuffers

*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek 20Mb 650K bytes per second Seagate 43Mb 800K bytes per second

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Part No.	Capacity	Access Speed	Price
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For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 £85

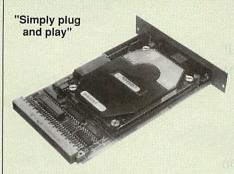
Internal Hard Disc Drives for A3000

ADA 0700 21Mb 23mS *£275 ADA 0720 44Mb 28mS **£TBA** Available **ADA 0730** 89Mb 18mS **£TBA** Soon

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

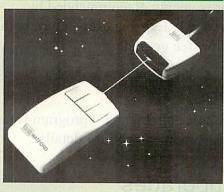
Archi IDE Hard Cards



Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install - you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650 21Mb 23mS £345 **ADA 0660** 44Mb 28mS £495 **ADA 0670** 89Mb 18mS **ETBA** (Can be used as a Removable Hard Drive)

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A300/400 internal 100Mb	£429

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BBC B compatible

B BBC B+ compatible M Master compatible

Master Compact compatible C

E **Electron compatible**

Archimedes compatible **BBC A3000 compatible**

→ PRIZE £50 ★

HIGH FLIER

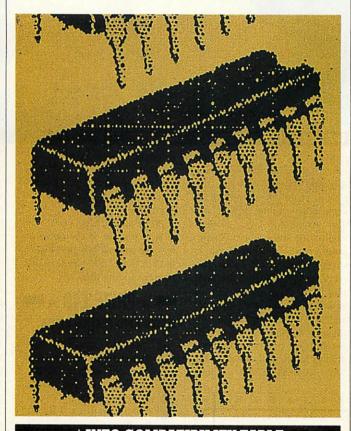
This is a submission from Andrew Jones of Ports-Quite mouth. simply, Andrew's little offering C draws clouds and as we E seem to have a long run-A ning nature theme, we thought it worthy of publication. Also, we could not resist the chance to publish a program that had Save Cloud as a menu option!

To tell the truth, Andrew's original program (which was written in Basic V) is not listed in the magazine, although you can find it on the monthly disc. Instead, in yellow pages, there is an Arm code version (McCloud - as in Machine Code Cloud) and an eight-bit version (Cloud8 - one less than cloud nine). Although these have both been written from scratch, they do rely heavily on Andrew's original cloud algorithms.

The actual cloud plot routine could be described recursively, although the algorithm used here is actually iterative. To draw some clouds, PROCclouds is called. This should be provided with three parameters; weather is a value between zero and 15, the larger the number the more thundery the clouds. Low numbers produce light, fluffy cumulus. High numbers give an impression of large cumulo-nimbus. The density option controls the density of the clouds. It can can go down to about 0.2. With lower values, the routine breaks down - try it and see. The upper limit is about 2 - any

DAVE ACTON and DAVE LAWRENCE

deliver their monthly mix of bits and pieces for your eight and 32-bit machines



LISTING	NAME	BBC B	MASTER	ELECTRON	ARC
Info 1	McCloud				*
Info 2	CloudSrc	*	*	*	OH THE A
Info 3	Cloud8	*	*	*	
Info 4	Bugworld				*
Info 5	ScrlTree32				*
Info 6	ScrlTree8		*		
Info 7	Resistor	*	*	*	*
Info 8	TESrc			HELL MORNING	*
Info 9	1LineStars	*	*	*	*
Info 10	1LineWaves	*	*	*	*
Info 11	1LineDemo				*
Info 12	1LineKite				*
Info 13	1LinePaint				*

higher than this and the picture no longer resembles clouds. Low numbers tend to give an even spread of cloud, more like summer cumulus. High numbers give more variation in cloud texture. The final parameter scale controls the size of the square of sky plotted. Eight is the maximum and gives a square 256×256. In other words scale is the log2 of the square size.

Because of the speed of the 32-bit version, it is possible to change these values in real time hence the extra front-end code in that version. It has a menu down the right hand side of the screen that shows the current settings for the various parameters. Clicking on a parameter with Select will increase its value and redraw the cloud with the new settings. Because the cloud is plotted randomly each time, you can't, unfortunately, see a weather system developing, instead you simply get examples of clouds with those parameters. To draw another cloud with the same settings, click in the Draw box.

Fairly obviously, allows you to save the current cloud as a sprite and Exit leaves the program. The BBC version takes many minutes to plot, so you'll just have to twiddle with the variables to see the different effects! As you can tell by the handful of CALLS, there's a small lump of code associated with the BBC version, this is used for peeking, poking and translating the screen. You only need to assemble this code once by running CloudSrc.

Mode 9 is used by the Archimedes version and the palette is redefined to contain a range of blues (for the sky) and greys (for the clouds). Of course we can't do anything nearly as colourful on the Beeb, so the tried and tested method of using Mode 2 and arranging the colours in brightness order is used here. To get



15 'colours' (grey levels) vertical dithering is used. This also effectively makes the pixels square again. This gives very effective results on a green or amber monitor (or B&W telly). If you have a colour monitor, well, just say that it's something incredibly clever, like computer enhanced false colour.

In both versions, the cloud image is first built up in an array, on the Archimedes this is a 260×260 byte array. On the BBC, the screen memory is used, but not in the way the screen is normally addressed, hence the peek, poke and trans routines and the rather odd way the screen is built up.

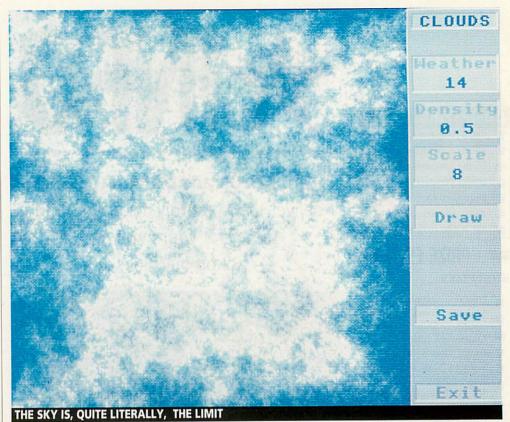
There are two phases to drawing a cloud picture. First the edges are drawn and then the central area is built up. The BBC version has PROCplot to plot a point, the Arc version, a macro, FNplot. Both of these plot a point of a given intensity, but add a subtly calcurandom quantity lated according to the various cloud parameters. When drawing the edges, the corners are plotted first, and then each edge is repeatedly sub-divided with the mid-point worked out as the average of the two end points and plotted, again with that cunning random factor included. This is performed by the first FOR loop.

The bulk of the picture is built up in a similar way. For a given square area (initially the full area), the central pixel is calculated as the average of the four corners and then

1	4	3	4	2	4	3	4	1
4	Y III						1 oh	4
3								3
4								4
2								2
4							FNI	4
3								3
4								4
1	4	3	4	2	4	3	4	1

X	X	X	X	X	Х	X	Х	X
Х	3	3a	3	3a	3	3a	3	Х
x	3a	2	3a	2a	3a	2	3a	Х
х	3	3a	3	3a	3	3a	3	х
x	3a	2a	3a	1	3a	2a	3a	Х
x	3	3a	3	3a	3	3a	3	х
х	3a	2	3a	2a	3a	2	3a	Х
x	3	3a	3	3a	3	3a	3	Х
x	х	x	x	x	x	X	X	Х

Figure one: Order of pixel plotting in cloud generator. The left hand figure shows the edges being plotted. The thick lines indicate the extra row and column used to ensure there is always a central point. The right hand figure shows the bulk of the image being drawn. Suffixed numbers indicate the secondary averaging used to plot the mid points of the central perpendiculars of each square.



plotted. Then for all squares (except the first full size one). the mid points between the

central point and the centre of each edge of the square are also calculated and plotted. Figure one shows the order the points will be plotted for a simple image. If you run Andrew's original program you'll be able to see this in action. Note that one extra row and column is needed for any image to ensure there is an odd number of pixels and hence

always a central point. This

four way averaging is per-

formed by the second FOR loop. As you can see there are two sets of embedded i and j loops to cope with the two sorts of averaging needed.

A BBC machine code version is not out of the question by any means, we just didn't have time to write one ourselves. Any offers?

PRIZE £40 ★ **BUGS AND MORE BUGS**

B Evolution emulators have

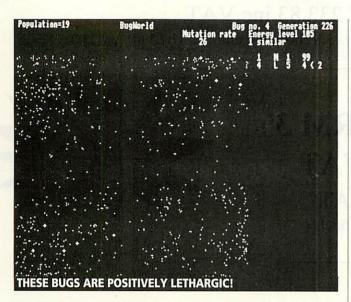
obviously taken the fancy 18 of many a BAU reader, and they take yet another C step forward with this next submission from I Reeve. BugWorld is a fascinating A inhabited place by 1000 'intelligent' bugs. These have genetic codes which are executed like small computer programs. Like previous emulators we've carried in ★INFO, the bugs can breed and genetic mutations can occur. Some will produce less able creatures, but some will be serendipitous and the children will be better suited to survive than their parents. Hence, you can watch evolution taking place in the comfort of your own home.

You may well remember T K Boyd's and A H Lancashire's programs (in the June 91 and October 91 issues respectively). In these, the bugs moved according to their gene patterns. Each gene type, if present, encouraged movement in a particular direction. BugWorld inhabitants have more complicated behaviour. Each has its own 'program' of up to 24 genetic instructions.

Our box called Bug Commands shows the valid instructions. As you can see, bugs have several potential advantages over those in previous emulations. Some can see food and move towards it, others can alter their behaviour when hungry. When a bug's energy level reaches zero, it dies. A level of 2000 allows a bug to reproduce.

Upon running BugWorld, you can load a previous world (saved as Bugs). If you don't, a set of simple bugs will be distributed randomly. These have simple instructions such as:

1 MOVE 10,90 That is, 80% of the time they move forward. Otherwise they turn randomly. These simple creatures are quite successful although you may see them



breed rapidly and exhaust their food supply quickly. To follow a particular bug, click on it with the pointer (or press T and enter its number). The bug's program will be shown on the right and the current instruction is marked with '<'. If a number appears to the right of this marker it means a loop is being executed. You might like to slow or stop the program with CTRL or SHIFT+CTRL so you can follow a particular bug's behaviour.

The grass in BugWorld is concentrated in the corners with deserts in between. These provide additional challenges to emergent populations. The simple bugs aren't determined enough to get across the desert, but sometimes their numbers are sufficient for one to make it by chance.

You can highlight a bug in a

particular colour by pressing keys 2 to 7 (red is already in use...as the grass!) The bug and all its genetically identical relations will change to the selected colour. Mutated offspring can be shown in a different colour (press D to toggle this option). After a short while you will soon notice that some bugs are changing. The likelihood of a change is shown on the screen and each bug has its own probability of having mutated offspring. You can save BugWorld at any point by pressing s. Saving and loading takes a few seconds as the grass has to be compacted and de-compacted.

Genetic changes can occur in several forms. Genes can be added, removed duplicated, swapped or can have their parameters altered. So, for example, the program of the simple bug could be changed to any of those shown in our Bugs To Try box.

As examples of more complicated creatures, Mr Reeve has included two creations of his own. These are stored, with the simple bug definition, as data at the end. An example of this is the Tummyrumble data. When its energy level is high, it moves around and turns quite frequently. However, when hungry, its behaviour changes and instead it turns less. By doing so it may march on the fresh pastures having exhausted the local food supply. Having found food it can revert to its original grazing habits. The Visionary is even more clever. It turns frequently and looks for grass. If it spots some, it moves off in that direction. Not only does this strategy enable the bug to find fresh pastures, in times of famine it can conserve energy by waiting for new grass to grow.

To add your own type of bug, simply add a data line containing its program at the end as with our examples and add the necessary lines in PRO-Cinit to set a bug to that type. Typically this requires a RESTORE to your data line followed by PROCset(t), where bug t is of your type. You'll also need to set up t's values in various arrays as with the examples. The meanings of the arrays are as follows:

e(t)energy 0 to 2000 d(t)direction 1 to 4 p(t)program counter 1 to start

c(t)loop counter 0 to start mt(t)probability of mutation 1=rare, 99='certain'

s(t)colour 2 to 7

m(t)generation number 1 to

I tried a bug of my own design which simply moved 30 forward then turned. This was quite successful at first and succeeded in wiping out all the simpler creatures. However, after a few hours, a much simpler mutated form had taken over. These moved forward almost constantly, turning very occasionally. It was interesting to note that a simpler species was actually more successful, although, given a larger world

and a greater variety of terrain (more deserts, more 'forests') I imagine several species of varying complexity might well evolve to form stable populations. Keep your eyes on **★INFO** we're working on fast machine-code versions BugWorld for both eight-bit and 32-bit machines. And of course, if you have your own evolution program or suggestions on how we can enhance any we've carried, please write to the usual address.

BACK TO YOUR ROOTS

We had a request from Ian Wolstenholme of Oldham for a program to display M ADFS directory trees on C the screen. Well, no E sooner said than done! The 32-bit version is A called ScrlTree32 and there's ScrlTree8 for Masand Compact users ter (shadow memory is required). The tree is drawn properly with the root at the top and subdirectories branching off downwards. As you might imagine, the directory structure (particularly of a hard disc) can be rather wider than the screen, so the program allows you to pan left and right with z and x. Press SHIFT as well to pan more quickly.

The fast panning is made possible by the way the tree is stored. First, the directories are explored recursively using FNbranch. This fills up some arrays with the names, depths and so on of all files and directories found. Next, the array is processed and the horizontal positions of the names are worked out so that none overlap. Finally, a string array e\$() is created to contain the tree in expanded text form. In fact, it is stored as an array of vertical strips - each one character wide. When the screen is scrolled by one character (in software on the Arc, in hardware on eight-bit machines) the newly exposed line is filled in by creating a one-character wide text window and printing the appropriate column string.

The number of files (max) is set to 150 on the eight-bit version. You may be able to get away with a few more, especially if you're using a

BUG COMMANDS

 MOVE r1.r2 - If RND(100) is between r1 and r2, move forward.

otherwise turn left or right.

- JUMP x,addr Jump to instruction at addr.
- LOOP n,addr If counter for bug is 0, set it to n and jump to addr.

Otherwise, decrement it. If not zero, jump to addr.

- SEE t,addr Look for food type t in current direction (1=grass, 2=another bug). If food is seen, jump to addr.
- HUNGER e,addr If energy level<e*10, jump to addr.

BUGS TO TRY

1MOVE 5,90 A subtle change in probability.

1MOVE 10.90 4LOOP 10,4 The loop at 4 will slow the bug down a great deal.

1JUMP 1 The bug will remain still (and die!)

1HUNGER 50,1 4MOVE 5,90 The bug will stay still if hungry, only moving if energy>500. An equally fatal mutation!



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second processor. On the Arc the limit is initially 200 but feel free to increase this as required. The limiting factor is memory. I've run the program for \$ on my (very full) 40Mb hard disc and about 1Mb of Basic workspace was needed!

→ PRIZE £20 →

COLOUR CODING

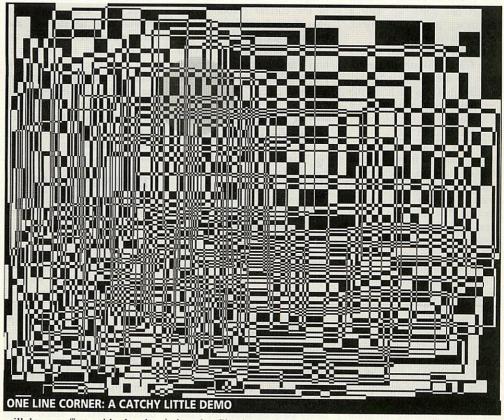
A simple program this. For all you budding electronic engineers who can not remember the colour C codes on your resistors, Andy Gibbons of Southampton provides the solution. Resistor runs on all machines and is simple to use. The cursor keys and RETURN are used to choose a colour band - when you have selected the number required the resistance value is shown. Press DELETE to restart, or 3 or 4 to select the number of bands. We particularly liked this program because of its use of dithered colours in Mode 2 to make up the necessary rainbow palette.

TO EDIT OR NOT TO ...

When a user requests a file to be run, Risc OS uses an operating system swi call. This is OS_FSControl with C register 0 set to four. This first checks if the name given can be run, (if it exists and is not a directory). If it is an application, it checks if a !Run file exists. The file type is then examined. Un-typed files are loaded at their load addresses, absolute files (type &FF8) are loaded at &8000, utilities (type &FFC) are loaded into the RMA. Other filetypes are run via their 'Alias\$@RunType_' system variable.

If no such variable exists, an error is generated. Modules (&FFA) are *RMRun and Commands (&FFE) are *Exec-ed. In the desktop environment, if an application 'knows' how to deal with a file type it will change the relevant alias. For example, Edit, changes RunType_FFF (text files) to: Run\$.Apps.!Edit.!Run %*0.

This means that if a text file is run, the !Run file of Edit



will be run first with the the text file's name as a parameter.

This will stoke up Edit and load in the file. The more observant of you will of course realise that this only happens if Edit is not loaded. If it is loaded, the file is merely loaded straight into Edit. This is because Risc OS never gets as far as running the file.

Remember last month's DoubleTake module? The Wimp actually gets in first and broadcasts a DataOpen message when the user double-clicks on a file. This gives the currently active applications a chance to see what type of file was clicked and load the file into a new window rather than passing the file through the Alias system and starting up a new copy of the application.

ToEdit is a very small application that simulates the user double clicking files thus loading them into Edit. If placed in your boot up sequence after loading Edit, you can use it to automatically load reminders, thing to do or note text files. ToEdit can be found in full on the monthly disc.

If you want to type it in, first create a directory ToEdit and design an appropriate sprite. Then run TEsrc and copy the SendToEdit utility into the !ToEdit directory. You will also need to create !Boot and !Run files. (see figure six).

Files can be loaded into Edit by simply changing the last few lines in !Run.

WISE WORDS?

We've had a letter from Mr J D Cooper of Oxford whose Wordwise Plus calendar program appeared in Eight Bits in BAU March 91. Evidently he's made a silly mistake as it says that 1992 starts on a Thursday! Anyway, to correct this simply add:

X%=Y%-1

after the label .fday and change the next line to:

S% = (X% + X% / 4) + (M% -1) *30+ (M%+M%DIV9) D-IV2+1

The last line of the program should also read:

TYPE "[F1]es64[F2]"

ONE LINE CORNER

Due to last month's reader survey, we've got no less B than five one-liners this month, three for the Archimedes, and two for the BBC: £10 goes to the author of each of them. We'll kick off with Stars from Robert Bergs of

|!Boot for !ToEdit Set ToEdit\$Dir <Obey\$Dir> Set Alias\$SendToEdit <ToEdit\$Dir>.SendToEdit %*0 IconSprites <ToEdit\$Dir>.!Sprites

|!Run for !ToEdit Obey <Obey\$Dir>.!Boot

|Example uses of SendToEdit SendToEdit <filename> SendToEdit <ToEdit\$Dir>.!Help SendToEdit adfs::4.\$.Textfiles.ThingsToDo

THE !BOOT AND !RUN FILES FOR SENDTOEDIT

Chaldon. Using Mode 2 and a

very simple animation techni-



que, (VDU 19 colour cycling), Robert has come up with a convincing parallax star field. Amigas, who needs 'em!

Another one liner comes from Gareth Moore of Hampshire. He uses a single bouncing line, but scrolls it up the screen on top of some text. All in all quite a remarkable result from such a short line.

A one line Archimedes 'demo' comes from Adrian Dale of Stockton. It features a traditional bouncing ball on a random pop art background. Because the Arc is so fast at drawing circles, the ball can be plotted and unplotted either side of a frame sync without any noticeable flicker.

Along with his resistor program, Andy Gibbons also sent Kite. This is yet another stringthing inspired ditty. Moving the mouse around the screen leaves a single line that spirals round and round rather like the tail of a kite. When will these stringy one liners ever end!

Finally for the moment, a full blown painting program from Gavin Sallery of Sawbridgeworth. Select will draw in the current colour. Select also chooses colours from the palette at the top of the screen. Menu changes the size of your brush and Adjust will prompt for a filename to save the screen to disc.

→ PRIZE £5 ★ MAKE AN IMPRESSION

Thanks to Keith Cox of Halifax for this little tip: 'The following information may be of use to owners of Impression 2.13 'Impression now supports the construction of grids and tables by means of vertical ruled lines. When attempting to produce alternate wide and narrow boxes by the use of two rulers, with different line spacings, we had all sorts of problems especially with the first box in the

sequence. 'The solution was to set up three rulers, each with the same vertical lines (this is relatively easy by using the Enter Values option). Ruler one should be set with a rule-off above the text, ruler two should have no rule-off and ruler three should have the rule-off below the text. It is then possible to vary the height of the box by changing the numbers of lines of ruler two. A further advantage of this method over changing line spacing is that you can easily insert multiple lines of text into one box.

FEEDING THE 5000

★INFO will, of course, be carrying hints, tips and programs for the new A5000, not surprisingly, we have yet to receive any! The programmer's reference manuals are still in production, so we cannot yet reveal any juicy bits of the new operating system. However, here are some snippets we've come across.

*RMInsert can be used to reinstate an unplugged module, but unlike *RMReInit, it is not reinitialised.

*WimpWriteDir changes the direction text is filled in in writeable icons. This is presumable to cater for languages that are written right to left

*ChangeDynamicArea performs much of the functionality of the MemAlloc module.

*Filer_Run is the equivalent of double clicking an object exactly what is needed instead of the SendToEdit utility.

*Filer_Boot is similar to the above, but simply boots the specified application by running its !Boot file.

*SaveFontCache, *LoadFontCache

A5000 TIMINGS

Time What happens . . .

Power on

1.5 Screen goes red

Screen goes blue Reset/Ctrl Break sequence starts here

Screen blanks

4.6 **Cursor appears**

Disc drive whirrs

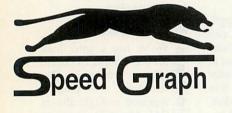
14.2 'RISC OS . . .' Banner Finishes here if not configured for desktop

15.2 Grey desktop drawn

17.1 **Hourglass appears**

Hourglass removed 21.8

Desktop ready



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Sadly this space is emty, as we don't have the O.K. for the product from our developers. But it is the product you are looking for. We are confident, that you will see it on the BETT Show.

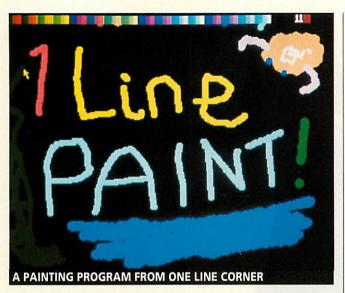


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I think their purpose should be self explanatory.

*DeskTop_SetPalette allows the desktop palette (colours zero to 15, the border and the three mouse colours) to be altered.

*Pin places a file on the background of the desktop.

*BackDrop replaces the grey desktop with a sprite. These can be scaled or tiled.

*PipeCopy is an odd one. It

copies a file one byte at a time or one or two output files! I'm sure there's a perfectly good reason . . .

*BlankTime sets the time for the screen saver (in other words the auto-blanker)

*CopyBoot allows MS-Dos boot blocks to be copied

*Format has of course been extended, in addition to the old L, D & E (lovingly referred to as Luxury, Deluxe and Executive), there is now F (Family?) for 1.6Mb ADFS and seven Dos types ranging from Dos/Q (1.44Mb, 3.5in) to Dos/U (160K, 5.25in)

*DOSMap allows Dos three letter extensions to be automatically translated to Risc OS filetypes.

CONFIGURATIONS

All mouse drag delays, distances, double click delays and cancellation distances are configurable as is the MenuDelay - the time before sub menus open automatically if the pointer is over one.

There are now 83 modules in ROM, most of which have 1991 dates. Those that don't are: Window Utils, IRQ Utils, and International Keyboard (1988). There's now a Territory manager, a Filer Manager, a Broadcast Loader, Squash and DragASprite.

Our favourite bit so far is that your currently selected directory is shown in full above your catalogue! Your CSD and your PSD (previous

AUTHORISED DEALER

selected directory) as well as the current filing system also appear as system variables very handy.

*OUIT

Sorry folks, it's time to shut up shop for another month. We've already got some excellent things lined up for the next ★INFO. To kick off we will have an automatic backerupper, from a reader in Dublin. We are also planning to introduce some of the larger desktop applications that we receive, on the monthly disc.

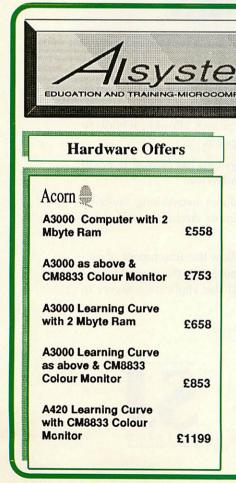
Dave Lawrence Dave Acton

Please send your submissions to us at; ★INFO, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, Lodon N1 6DJ.

All but the shortest of programs should be on a disc and accompanied by a brief description of their purpose and operation. A stamped addressed envelope with your submission will ensure the return of your disc.

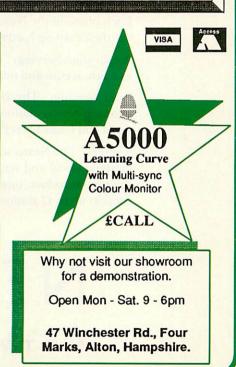
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YOUR ROUTE TO



The launch of Nexus routers in the Autumn marked the next phase of the Nexus development strategy leading towards a high-performance network.

Each phase in the Nexus strategy will build on the previous phases, allowing schools to use their existing hardware as components in an expanded system.

Application Serving. The SJ Nexus server for Archimedes systems has proved its worth as a fast, secure and reliable system which is easy to set up and to use.

Print Serving. The optional print serving software introduces networking facilities, allowing Nexus stations to access printers attached to a remote Archimedes. Parallel, serial and Laser Direct printers are supported.

Routers. The Nexus server software has been upgraded to allow the attachment of subclusters. Local and remote sub-clusters can be linked via routers to the central server. Routers introduce more flexible wiring options and expand the application server to support up to 12 stations.

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BETT'92 PREVIEW

If you are involved in computers and education, then BETT '92 is the show to see. We outline the Acorn-related products on display

idely regarded as one of the most comprehensive educational IT events in the country, BETT '92 is an essential visit for educationalists at all levels.

The exhibition is due to take place at London's Barbican Centre from January 22 to 25. Sponsored by the BEEA and our sister magazine, BBC Educational Computing and Technology, the exhibition will feature over 200 companies and a wide range of activities, including free seminars, a software centre, an Acorn Village, a Publishing Village and a Special Needs area.

A wide range of companies from the Acorn marketplace will be attending, and most will be showing new products. And, of course, the team from BBC Acorn User will be there. To help give you a flavour of what Acorn-related products you can expect to see at the show, we have compiled a list of selected highlights here, with exhibitor stand numbers in brackets.

STAND SELECTION

Acorn Computers (R7a/R6d/R30) will feature strongly at the show and will be highlighting the recently launched A5000 Learning Curve package. Another new product rumoured to be at the show is Acorn's long-awaited portable, although details could not be confirmed at the time of going to press.

Aleph One (R3a) will feature a range of upgrades for the Archimedes, including its recently launched Arm3 board.

AVP (R26C) will be demonstrating its new hypermedia package, Freedom. This includes self-supporting modules designed for science, geography and history. Text and graphics can be combined to provide colourful lessons which can be accessed quickly in a variety of ways. Materials linked to the National Curriculum can be reviewed, browsed through, displayed and printed out.

The company has added 150 new programs to the thousands included in its Black Catalogue, which will be available free at the show.

Clares Micro Supplies (R30e) will be showing its extensive range of software packages, along with the company's replacement mouse for the Archimedes. New software includes three music-related packages - Rhapsody 2, ScoreDraw and VoxBox - which together form a comprehensive music editing suite. This provides output via the computer's sound, Midi keyboard or, using ScoreDraw, as a high-quality printed score.

For anyone involved in package design projects, the Illusionist and Render Bender II graphics applications will be of interest. Other



CUMANA WILL BE SHOWING A WIDE RANGE OF CD-ROM DRIVES

new programs include Plot, which plots graphs from CSV data or by entering equations, and Titler, a video titling and presentation package.

Colton Software (R31h) will be demonstrating its long-awaited package, Pipedream 4. The advanced word processor, spreadsheet and database package offers many new improvements over Pipedream 3.

Computer Concepts (R30b) will feature a new range of software and hardware products, with the unquestionable star of the stand being ArtWorks, a new graphics design package. This object-orientated graphic design and illustration program for the Archimedes is intended to compete with the leading illustration programs for other machines. Other new software includes Compression, a file compression utility (see our review on page 115).

Hardware on display will include the Scanlight Professional 256-grey scale scanner and the LaserDirect Hi-Res 4 600dpi laser printer, the first of its kind under £1000.

Cumana (R11b) will be featuring a comprehensive range of CD-Rom drives (see above). Compatible with A3000 and Archimedes machines, the drives are available in internal, single and multiple four and six-pack versions.

The company will also be launching a new range of SCSI interfaces for the Archimedes.

Digital Services (R29d) has a new application which allows a mailmerge link to be created between its Squirrel database software and Computer Concepts' DTP package, Impression. Also on show will be its tape streamers and the Waiter front-end menu system.

SPECIAL FEATURES

BETT '92 will include a number of special features, including:

- Free subject-based seminars, covering various aspects of IT and related topics
- An Acorn Village, featuring most of the exhibitors included in this preview
- A Publishing Village, designed to give visitors an insight into text processing and desktop publishing
- A Special Needs area, which includes a wide range of hardware and software for special needs applications



REVELATION 2 REVEALED



WHERE TO FIND US

Come along to the BBC Acorn User stand at the show, You will be able to obtain a copy of the latest issue, take out a subscription, or obtain useful advice about Acorn machines and the Acorn market in general. Our stand (R31a) is situated in the Red Hall upper section, immediately adjacent to the stairs to the lower hall section. We look forward to seeing you at the show.

Electromusic Research (R31g), which has probably produced the largest range of computer-aided music products for education, will be offering 28 software programs and peripheral hardware for the A3000/Archimedes, as well as a full set of BBC micro programs for Midi instruments.

New programs include Studio 24 Plus V3. StoryBook 2, RhythmnBox 2, SoundSynth 2, VuMusic 2, SongBook and Mister Sound.

ESM (R28c) will launch a new 1992 edition of Desktop Folio, the wordprocessing and desktop publishing package for education. The company will also launch a new range of theme packs to supplement the package, along the lines of the Christmas version recently released.

Another release is a new Archimedes version of the BBC micro geography pack, World Map Study. This is a map-based database for storing and manipulating geographical and environmental details. ESM has also adapted many of its BBC micro packs to run on the Archimedes under emulation.

4Mation (R32a) will be exhibiting several new products and previewing items still under development. The new products include Chameleon, which allows draw file colours to be easily changed, and smArt, a linked graphics program which now features new cartoon and modern languages discs.

Packages that the company will be previewing include Noot, which can help to create animated stories and quizzes for younger children; The Riddle of the Trumpular, a fantasy adventure aimed at primary level; Vector, a drawing package for the creation of draw files, and Masque, a sprite animation package which allows animated sequences to be combined with music.

HCCS (R31d) will be bundling a CD-FS CD-Rom filing system with every SCSI product sold, including HardCards. A new CD-Rom player plus CD-Roms working in native Risc OS under the PC Emulator will also be available. Genesis, a new mono digitiser costing under £100, is available as an A3000 internal podule and Archimedes 400 series/A5000 single width podule. Also look out for the company's 2Mb Ram upgrade for the A5000.

Ian Copestake Software (R29g) will be selling its range of ideA IDE upgrades for the A3000 and Archimedes.

Lindis International's (R36c and d/R37) product division, Lingenuity, will be launching Presenter GTi, a top-of-the-range graphics package. It retains the features of the company's Hotlink Presenter, with the addition of a wide selection of graphs and charts, scaling facilities, and a dynamic worksheet area.

CableNews is a new presentation package which includes two applications, CableMake, an authoring system or 'page editor', and Cable-View, which is used to play back the presentation.

Longman Logotron (R13e) will be previewing several new packages for the Archimedes, including Eureka, a spreadsheet for the Archimedes. Although the package is expected to meet the needs of many educationalists, it has been designed in line with the company's philosophy of producing packages for a wider market. PinPoint Junior is a version of the

PinPoint data acquisition and presentation package, and is aimed at the junior school classroom. PenDown Plus extends the facilities offered by the original *PenDown* text processor.

Revelation 2 is the new version of Longman Logotron's art and graphics package (see our review on page 121). Other new products include Notate, a simple music processor, and *Insight*, a data capture piece of software.

Minerva Software (R29e) will be featuring PrimeArt, its new art package designed for primary and special needs users (see our review on page 111). GraphBox Professional is a comprehensive graphing package which should find itself a niche in science and mathematics applications.

Northwest SEMERC (B49d) will be showing the Olham SEMERC Overlay Keyboard, a touch sensitive device designed to encourage active learning through discovery.

Developed by iibit Education Products for the BBC range of computers, the A3 keyboard consists of 128 programmable keys on to which a software overlay sheet is placed. Also on show will be a prototype of an expanded keyboard for the A3000/Archimedes. New overlay keyboard software packages will also be on display, including Ghost Stories, which features various spooks and skeletons.

Oak Solutions (R32c) will include its range of multimedia, CAD and Econet software, as well as programming tools and the Oak Recorder sound sampler. The company's range of SCSI hard disc drives, tape backup systems and A3000 upgrades will also be shown.

Pres (R31j) will feature a wide range of A3000 upgrades, including the new A3K4 double podule expansion. This will allow users to add a second standard Eurocard podule to their machines.

Risc Developments (R24a) products will include the recently launched A5000 Ram card and software packages including Chartwell, a graph and chart package, and PolyGlot, which gives access to foreign language character sets.

Sherston Software (R28a) will be launching a new adventure game for the A3000/Archimedes. Set on a distant planet children have to use their skill to save The Crystal Rainforest from destruction.

Also on show will be Cartoon, a cartoon strip publisher; Hilighter, a powerful information handling package; Recall, a new database package, and Glimpse, which allows miniature versions of sprites and drawfiles to be browsed through quickly.

Techsoft (R10c) will be exhibiting a wide range of Cad/Cam software and hardware.

Watford Electronics (R10b) will feature its range of peripherals, including an Arm3 upgrade for the A3000, IDE interface cards and scanners.

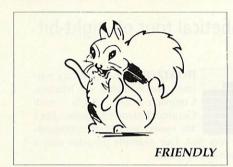
GENERAL INFORMATION

- BETT '92 runs from January 22-25 at The Barbican, London. Opening times are 10am-6pm (Wednesday-Friday) and 10am-4.30pm (Saturday).
- The exhibition is organised by EMAP International Exhibitions, 12 Bedford Row, London WC1R 4DU. Tel: 071-404 4844. Admission is free, although under-18s will not be admitted.

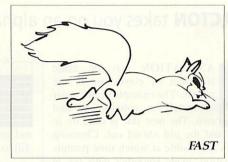
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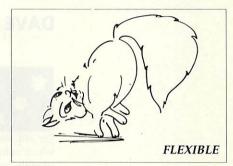




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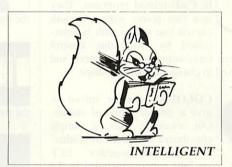
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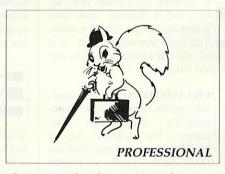
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THE A-Z OF BEEB

DAVE ACTON takes you on an alphabetical tour of eight-bit



ANIMATION may be made smoother by clever use of the palette. The example draws a star alternately in colours one and two. The new star is ORed on to

the old star, and the old ANDed out. Choosing which colours are visible at which time permits smooth animation, made smoother with *FX 19 which waits for vertical sync. Of course for complex animation, machine code must be used.



BEZIER curves are often used in CAD-related programs. They join two points with a smooth curved line whose path is determined by two other control

points. These form tangents to the curve and may be moved to change the curve's shape.



COLOURS can be mixed to give a greater range of shades. Our example uses a simple chessboard character to 'dither' two colours together. ECF

(Extended Colour Fill) patterns included in the Graphics Extension Rom can be used to similar effect on Masters and Compacts.



DECIMAL numbers are crucial to accurate calculations and may be used in machine code programs by using a simple routine. The most commonly used is a

two-byte decimal, and our example displays any two-byte unsigned integer.

ERATOSTHENES' Seive reveals prime numbers by systematically eliminating non-primes. The example uses a Mode 0 screen and one pixel per

number up to 10000. All non-primes are plotted in white - any remaining black pixels correspond to the prime numbers.



FUNCTIONS can be used in conjunction with EVAL to call program segments by name. The example shows this. Simple adventure games can use this

technique to respond to keywords although most adventure games will have a complex parser.



GOTO and GOSUB, the two 'spaghetti' keywords should be avoided at all costs. They make programs hard to follow and prone to errors. The user should

use procedures and functions in preference, which lead to structured programming.



HORIZONTAL line filling routines are available on Masters, Compacts and Beebs with Graphic Extension Roms. They are issued with PLOT commands

and are very fast. Our example program uses a 'fill to non-background'.



ITALIC characters may be produced from the standard character set. Definitions are read with OsWord 10 and slanted by shifting the top half of the character to

the right and the bottom to the left.



JUMP tables are useful ways of keeping machine code routines short. The example program waits for key 1, 2 or 3 to be pressed, then reads the address of

the routine from a table and jumps to it.



KEYPRESSES are best detected using INKEY and a negative number if time is crucial. When keys are held down a lot (such as in games) this noticeably slows the

computer. The example shows how to disable the keyboard with *FX 178 and displays the INKEY numbers for keys (INKEY can still be used but no keypresses are buffered). The operating system sometimes likes to re-enable the keyboard, so you may have to repeatedly issue the .*FX 178.



LINKED lists are valuable structures. Items are linked by pointers. In the example, random numbers are inserted into such a list according to their size. Each

number is stored with a pointer to the previous and next number in the sequence, (using -1 if it is the first or the last of the list). Insertion only requires the changing of pointers, so the technique is useful for larger objects like strings.



MANDELBROT (Benoit B) discovered a famous set of objects which were fractal in nature (appearing fragmented, however magnified) and could

be viewed as beautiful patterns of infinite detail. BAU has carried many Mandelbrot programs. Our one-line example shows the whole set.



NOT is translated in Basic as NOT – a handy logical operator. It can be used with AND to clear certain bits of number, as in our example. The meaning of NOT in

logical statements is similar to the English 'not'.

PROGRAMMING

programming. Turn to the yellow pages for some example programs

ONE line programs, although of little practical use, have always been a challenge to programmers. Many tricks can be used to keep code short. In our example,

there is no colon after the REPEAT and b isn't zeroed since Basic does this when b=1-b is encountered. NEXT, is short for NEXT:NEXT. Some one line programs can't be typed in without using keyword abbreviations as the command line will only accept 256 characters. See M for another example.

PRETTY printing is 'intelligent' display of text. Our example shows the basic idea of splitting text at spaces so that words do not run over the ends

of lines. More advanced programs hyphenate words when no convenient space or punctuation mark can be found, but require tables of exceptions to do the job well as some words may become difficult to read.



QUICKSORT is Anthony R Hoare's fast sorting algorithm. It works by dividing an array into two parts, one where elements have values below a 'partition'

and one with values above. Each part is then itself sorted into two partitions, and so on until the whole array is in order.



RAY tracing is a technique for creating pictures of imaginary scenes. Light rays are 'traced back' from the screen until they meet an object in the imaginary

world and are reflected, refracted and so on. This can be used to create realistic graphics. Our example is a simplified version of Richard Browning's program (BAU May 89).



SCROLLING text can enhance games and demos and, as the example shows, requires little coding. You can scroll 'in the background' using the VSync

event, but you must not use operating system calls like OSWRCH, as our example does.



THREE-dimensional graphics can be quite simple to achieve. The example plots a solid goblet. A point (x,y,z) can be represented on the screen by dividing

each of the x and y values by the depth, z and multiplying by a suitable value. Care must be taken to plot polygons in the correct order (rearmost first), so that the object appears solid.



USER routines, can be shown by our example USERV (at &200, &201). This contains the address of a user routine called when *CODE <a> is issued; a and b are passed to the routine in the X and Y registers.

For simple commands, *CODE saves programming time because the complex decoding is done by the operating system. *LINE also uses USERV – see X for an example.



VARIABLE names should generally be in lower case. The exceptions are integer variables A%-Z% and @%. Lower case names not only look clearer but

aid searching and replacing. If we use the Basic Editor or similar to replace all occurrences of N in our example, we'll also change keywords like NEXT and END. Clear (but not excessive) spacing also aids readability, as do colons between procedures and functions.

M	T	W
	1	2

WEEKDAYS can be calculated by reducing a date (day, month, year) to a single number. Knowing that the 1st January 1901 was a Tuesday, we can calculate any

other. Our example includes procedures for entering and checking dates as well as calculating the name of a given day.



X is used as a prefix for Archimedes calls, if errors are to be ignored. Similar can be achieved on eight-bit machines. Our example assembles a user routine

which can be called with *LINE. Any star command given to it will be executed, but errors will be ignored. The error handler currently displays the error message in brackets, but could equally well do nothing. The original Basic error handler is restored whatever happens.



YES or no is a frequently requested response for the user to type in. Our example function can recognise these words and then return the logical values

TRUE or FALSE accordingly. Useful stuff!



ZERO Page X is a 6502 addressing mode that can save space. When referencing tables or strings stored in zero page, (memory addresses &00 to &FF)

there are special opcodes for LDA zp,X and so on, that require only two bytes per instruction, as opposed to three if using Y (LDA &00zp,Y). They also provide faster access to memory.

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f you already use Basic, and would like to know about Arm programming, this could be the series you've been waiting for! It's quite amazing how many letters I get from readers of ★INFO asking 'what do all these MVNs, TEQEQs and SWINEs mean?' Rather than answer all your questions individually, we decided to unravel the jargon via these pages with a tutorial series, I'll assume you know nothing about Arm programming, but would like to know everything. We will however, relate most topics to their equivalent in Basic.

OVERVIEW

I know it may sound obvious, but the first thing to realise about Arm programming is that you are dealing with the Arm (Advanced Risc Machine) chip directly and you're not in a nice regulated environment such as Basic. If you tell the chip to do something, it will do what you tell it, nothing less and nothing more.

Basic does a lot of things behind your program's back that you probably take for granted and, if you still want these facilities in your Arm programs, you'll have to put them in yourself. Don't worry about this for now, I'll point out the details later on.

Suffice to say, that amongst the things you don't get are: floating point variables (decimal numbers), string variables, arrays, division, transcendental functions (SIN, COS, LOG, etc.), structures (FOR...NEXT, CASE, REPEAT...UNTIL, etc.), functions and procedures, and input/output functions (PRINT, INPUT, BPUT, BGET and so on.)

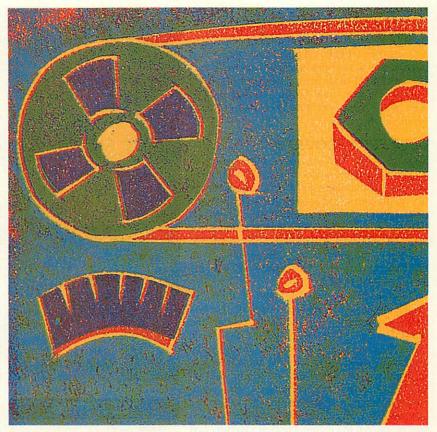
In fact all you do get is 16 integer 'registers' (effectively the Basic variables A% to P%), six ways of adding and subtracting, two ways of multiplying, four binary operators (like EOR in Basic), four tests (similar to IF in Basic), four ways of 'getting at' data in memory and a GOTO instruction. Of course, I am painting the picture very black at the moment. Just because you don't get all the functionality of Basic for free, it doesn't mean you can't do these things.

Most of the above list can be achieved with a very small amount of programming and many of the I/O functions are provided by the magic SWI instruction which gives you access to the operating system and all that offers. Basic itself uses these calls - translating PRINT and so on, into the relevant SWI call. It's amazing what you can do with so little!

BEGINNING A PROGRAM

When you write a Basic program, you probably load up the Basic editor, start at line 10 and type in the various instructions to make the computer do what you want it to do. To set your program running, you'll quit from the editor and type RUN. If want to alter the program in some way, it's back to the editor for a while before running the program again. This system is used because BBC Basic is an interpreted language - the program is effectively translated one line at a time while it is running

Writing a machine code program (on any machine) is slightly different. You still need to type the instructions into an editor and you still need to run the program but there's an extra stage in the middle - assembly. Basic can understand the five letters P, R, I, N, T and do



ASSEMBLY

In the first of our new series,

DAVE LAWRENCE

introduces you to Arm programming something sensible with them. (Actually, this is not strictly true. BBC Basic, in fact, tokenises most of its keywords into one or two bytes as they are entered.)

In contrast to Basic, the Arm chip would have a fit if you tried to tell it to M, O, V something. It is the job of the assembler to take the English descriptions of the Arm instructions and translate them into the appropriate series of zeros and ones that the processor understands.

As you may know, BBC Basic is renowned for having a built-in assembler; this makes it very easy for users to develop machine code programs. You can use the Basic Editor to create and edit your code and, with a minimum of extra twiddly bits in your program, you can assemble it by simply running it.

Other methods do exist. For instance, when I'm developing very large Arm code programs, I use Acorn's Twin editor and Aasm assembler. These are purpose-written development tools and provide many facilities over and above Basic. Perhaps once you've read these articles and are a proficient Arm code boffin you may like to start using them, but for now, forget I ever mentioned them!

YOUR FIRST PROGRAM

Yep, the waffle is finally over: this is going to be your first, but hopefully not your last, foray into the wonderful world of Arm programming. It is traditional to get a computer to display the message Hello World! as a first experiment and I see no reason why we should abandon ritual here. Of course, if it was you who used to go into Boots and write 'Clive Sinclair is a... ' on the Spectrum, you could always change the message as required.

Program first - questions later, I think: so quickly type in the listing shown in the box below - you can type in the listing line by line using Basic's AUTO command or the Basic Editor, whichever you prefer. The spaces at the start of lines 130 to 170 are not actually necessary and you can miss them out if you want to. Just make sure there is at least one space between the various instructions (SWI and so on) and the rest of the line (the parameters). Once you've entered the listing, check it carefully and save it. You can now assemble it by typing RUN. To actually run your program and print Hello World! type CALL hello. Exciting eh! Did you notice the sheer power of your 32-bit Risc processor? Of course not, that's not the point of this program. It does however, illustrate a few important concepts - I'll take these line by line.

Line 60 uses Basic's DIM command to allocate some memory. DIM is normally used for creating arrays in Basic, but if you DIM a variable and give a value with no brackets, that many bytes will be allocated to the variable instead. We've asked for 100 bytes which will be plenty for our program. Lines 70 and 80 set up 'aliases' for two of the Arm chip's registers. Remember those 16 integers? Of these 16 (which are called R0 to R15), you are completely free to use 13 of them (R0 to R12). The remaining three have special purposes, although only one of them (R15) is absolutely dedicated to its cause. For the moment it is best to assume that R13, R14 and R15 are out of bounds for general use.

Register, R15 is also known as the program counter and often abbreviated to pc. Its job is to keep track of where to find the next instruction to execute in your program. There is no real analogy in Basic, although a program counter is used. If you type TRACEON, the computer will print the line number it is on just before executing the commands on that line. The Basic program has no access to this information and has no real need to do so. In fact, TRACE is merely supplied as an aid to debugging. In machine code, the program counter is much more important and you quite often have to deal with it directly, as we do in listing one.

Register 14 is a close relative of the program counter and is often referred to as the link register. All you need to know for now is that it



THE LISTING

10REM	>ARM1		
20REM	By Dav	e Lawrence	
30REM	For 32	bit machin	nes
40REM	(C) BA	U February	1992
50:			
60DIM	code 1	00	
701in	c=14		
80pc=1	15		
90FOR	pass=0	TO 2 STEP	2
100P%=0	code		
110 [OP	r pass		
120.hel	110		
130	SWI	"OS_Writes	3"
140	EQUS	"Hello Wor	:1d!"
150	EQUB	0	
160	ALIGN		
170	MOV	pc,link	
180] NEX	KT		

knows how to get the computer back to what it was doing before your machine code program interrupted it. In this case, that means how to get back to Basic. Lines 70 and 80 just give these two registers more readily understood names.

Lines 90 to 110 (and line 180) contain the twiddles you need to use the Basic assembler. In this example, you don't actually need the FOR...NEXT loop, but in most programs you will and it makes sense to get into good habits straight away. I'll explain why a loop is used when we actually need one.

Line 100 tells the assembler where to start assembling the code. This will be at our allocated 100 bytes at code. The P% is actually a hangover from the BBC, where it stood for program counter. Quite by chance P is the sixteenth letter of the alphabet and therefore corresponds to the Arm's program counter, register 15. Line 110 finishes the preamble for the assembly. The [tells Basic that everything up until the next] (line 180) is Arm code, so assemble it rather than run it.

The code itself sits between lines 120 and 170. To make note of an address when assembling, you use the syntax shown on line 120 - a variable with a dot at the beginning. This effectively means: assign the current assembly position to the variable hello. So, hello will therefore contain the address in memory of where our machine code program starts.

We're straight in at the deep end with line 130 and a swi call. The operating system and its associated modules provide many calls allowing access to their functions. The operating system itself provides a handful for printing text on to the screen. The one used here is OS_WriteS, note the underscore character and the position of the capital letters - all are important. The assembler will convert this string of letters into a single number that the Arm chip will understand as a call to the operating system.

Next, OS_WriteS displays a string of characters, in much the same way as Basic's PRINT. The text to print should be stored in memory immediately after the SWI call and if you look at line 140, you'll see what I mean. EQUS is actually an instruction to the assembler rather than the processor. It means: store the ASCII values of this string in memory. The OS_WriteS will continue printing characters from memory until it reaches a zero (that's the value zero, not a character Ø). This is stored by the EQUB on line 150 and works in much the same way as EQUS but stores a single byte in memory.

Line 160 is also an instruction to the assembler. Data can be accessed by the Arm chip from any address. However, Arm instructions themselves will only work properly if they lie on address that is exactly divisible by four. The ALIGN on line 160 makes sure that the assembler starts assembling the next instruction on such an address. The final line, line 170, returns the computer back to Basic: MOV is short for 'move', pc is the program counter and link is the link register. The instruction therefore means move the contents of the link register into the program counter. Link knows the way back to Basic and pc tells the computer where to execute the next instruction. And there you have it, a very simple Arm code program.

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any people have yet to discover the value of spreadsheets, even though they can be just as useful as the more popular database or wordprocessor packages. In fact spreadsheets are similar to wordprocessors: they just manipulate figures rather than words.

On-screen a spreadsheet looks like a sheet of paper divided up into rows and columns. The resultant boxes are called cells and in each cell you can enter either numbers or text. Yet despite the similarities in appearance, spreadsheets have many advantages over the traditional pen and paper method. Data can be changed easily and often, without the normal crossing out, and most importantly, you don't have to do the calculations yourself - the computer does it for you. It also remembers formulae and will automatically recalculate if you change the figures.

Additionally, because spreadsheets have no rigid structure they can be used for all sorts of tasks: they can compare prices to pick the best buy, organise your household budget, sort out a company's cash flow or even build complicated statistical models.

Even a simple spreadsheet, such as one set up to keep tabs on your household's budget, can be used to explore the 'what if...' scenario. For instance, if your rent goes up but gas and electricity prices go down, the spreadsheet can instantly calculate the effect that these changes will have on your long-term budget.

There are many other ways to use a spreadsheet and a recent development is the concept of Spreadsheet Publishing, allied to DTP, as some spreadsheets now use fonts, include graphs and even drawing tools. And thanks to macro facilities, many spreadsheets can also create selfcontained applications. These are usually developed for stock control, accounting or generating instant reports. Once the stand-alone application has been developed, it can be used by just about anyone.

HOW TO SET UP A SPREADSHEET

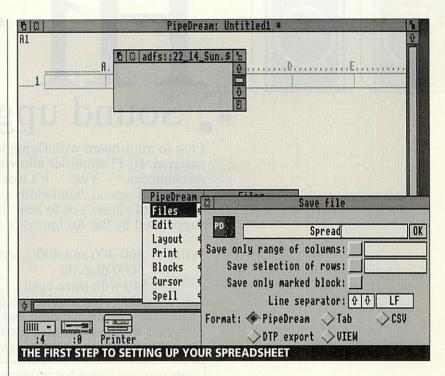
We are going to use a popular package, PipeDream 3, to set up a spreadsheet to deal with the simple purchase of a computer, monitor, disc drive, printer and some software. However, as the principles described are common to all spreadsheets you should be able to adapt them to whichever package you have access to.

Click on the application icon to load Pipedream on to the icon bar, then click Select on the icon bar to bring up a document - as it will not be full size, click the toggle icon in the top right of the window. Alternatively, click Menu over the icon, move along the Windows submenu and select New window.

In PipeDream each document is divided into rows, which are numbered, and columns, which are referred to by letters. Although initially setup with six columns, you can alter this figure and define how wide each one will be. Each box, or cell as it is known, is referred to by its column and row coordinates, for example B7.

STEP ONE - BEGINNINGS

To make the document suitable for use as a spreadsheet you will first have to change some of its values. Bring up the document's menu, and from the Files submenu select Options. Turn



Borders and Grid on, and Justify and Wrap off, by clicking on them. Click on the Numbers option next to the New slot format - all cells will now be expression, not character cells. Then click on OK.

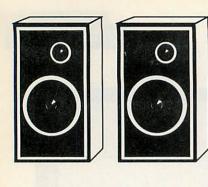
To save this set-up as your spreadsheet template, move over Save from the Files submenu, enter the name Spread (as shown in the screenshot above), and then drag the PipeDream icon into a directory viewer. This name will then appear at the top of your document.

When you start up PipeDream only the first row is displayed. Notice that the A and the 1 are highlighted, and that there is a red text caret in cell A1. A1 is also repeated in the top left hand corner of the window. The area below this space, but above the column labels, is known as the formula area. This is where PipeDream displays the contents of the number cell.

Give the spreadsheet a title by typing a name into cell A1. For the purposes of our demonstration enter Computer System Costs; to centre it in the first row, select Centre align from the Layout submenu. Ensure that the caret is at the end of the title, then press RETURN and it will be cenA spreadsheet can do wonders for your working routine.

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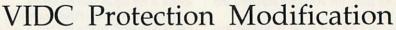
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tred. Now we are ready to go about building up the customised spreadsheet.

STEP TWO - WORDS AND NUMBERS

The first thing you have to do is to type in the headings. Position the caret in cell A2 by moving the pointer over it and pressing Select. Then type in the column heading, Item - it will appear on the formula line. Press RETURN and the word will appear in the selected cell in your document. Then press TAB to move the caret into B2 and type Value followed by RETURN. Press TAB and the caret will move to C2. Type VAT and press TAB and the caret will move to slot D2, then type Total.

Under the heading Items, the purchases -Computer, Monitor, Disc drive, Printer and Software - should be entered in exactly the same way. Remember to press RETURN to move to the next line after each entry. Before typing in Computer miss out a cell, and after your list of equipment miss out another cell and type Total. Your spreadsheet should now look like the screenshot below.

Now you want to position the caret in slot B4 so that you can enter the price of each item. Click Adjust in B4 or click Select in A4, then press TAB. Type 500 (it will be displayed on the formula line); when RETURN is pressed, B4 becomes a number slot, containing the number 500.00. Numbers in PipeDream are automatically displayed with two decimal places, but you

		Compute	er System Costs	100
Iten	Value	VAT	Total	
			unii mai empi ineexites ili	
Computer			ellik estellereki densambe en:	
Monitor				
Disc drive				
Printer				
Software				
TOTAL				
TOTAL	1			

can change this if you want to by changing Decimal places in the Options submenu.

STEP THREE - FORMULAE

Press TAB to position the caret in slot C4. Type in B4*.175. This formula multiplies the contents of slot B4 by 0.175 to work out the VAT. Press RETURN and C4 will now display the result of the formula, 87.50.

To work out the total cost, press TAB to position the caret in slot D4 and type B4+C4. Press RETURN and the total price, 587.50, will appear in slot D4 as shown opposite. Entering the costs for the remainder of the equipment is just as easy; move to the appropriate slot in the B column and type in the prices 200, 250, 350 and 120 respectively.

STEP FOUR - REPLICATING

To work out the amount of VAT for each of the other items position the caret in C4 and Drag-Select to C8, so that cells C4 to C8 are marked as a block, displayed on a black background. Now choose the Replicate down command from the Blocks submenu. PipeDream will replicate the formula that you typed into slot C4 for all the cells in the highlighted block, updating the

1		Accordance	Computer S	Custem Costs),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
I	tem	Value	VAT	Total		
Cr	omputer	500.00	87.59	587.50		
Me	onitor					
D	isc drive					
Pr	rinter					
Sc	oftware				marries a	
TO	DTAL					

*********	1111111111111111111	Computer Sy	istem Co	sts	**********	* * * * * *
2 Item	Value	VAT	Total			
3 4 Computer	500.00	87.50	58	7.50		
5 Monitor 6 Disc drive	200.00 250.00					
7 Printer	350.00		Pipe		Blocks	
8 Software	120.00		Fil Edi	Mark block Clear markers		Z Q
8 TOTAL			Pri Blo	Copy block Delete bloc	to paste li k	st Bl
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			Spe	Replicate r	ight	BF BS
				Search		BS

cell reference in the formula as required. When you have finished don't forget to clear the marked block by choosing the Clear markers option. In the same way the formula in cell D4 can be replicated for the whole of that column.

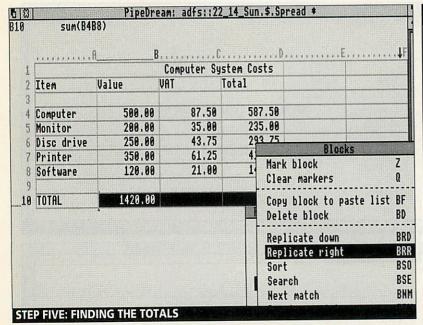
STEP FIVE - ADDING UP

It's now time to total everything up. Position the caret in B10, type SUM(B4B8) and press RETURN. The total value of all the items in column B will now appear in B10. SUM adds together the value of all the cells in the given range. In a large spreadsheet this can save an awful lot of typing in.

In the same way that you replicated the formula for VAT, the formula in B10, SUM(B4B8), can be replicated into cells C10 and D10 and updated accordingly for the VAT and Total columns. However, this time you have to Drag-Adjust (not Select) and remember to use the Replicate right command available from the Blocks submenu.

STEP SIX – HOME IMPROVEMENTS

As all the figures in your spreadsheet are prices, it would be nice if they were all preceded by the pound sign (£). Mark slot B4 (if you want to



highlight an individual cell you can press F3) and Drag-Adjust to mark all the number slots. Then in the Layout submenu click on the Leading characters command.

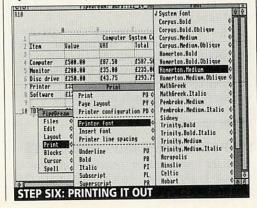
Another improvement would be to adjust the alignment so that the headings are aligned with the numbers in the column beneath them. At the moment the text slots are automatically left aligned, while the number slots are automatically right aligned. Mark all the number slots, again using Drag-Adjust, and Select the Left align command from the Layout submenu.

You may also want to change the width of various columns. Press CTRL-w to bring up a dialogue window to set the column width of individual columns. Likewise, if you need a larger spreadsheet than the one provided, CTRL-F9 will add more columns.

When your spreadsheet is complete, don't forget to save it. As before, Select Save from the Files menu, name your spreadsheet and drag the PipeDream icon to an open directory viewer.

Finally, when it comes to printing out, it is better to use outline fonts rather than system fonts. I find Homerton Medium in 12pt ideal for my spreadsheets. To change the font you have to go the Print submenu, select Printer font and then click on the font of your choice, as shown in our final screenshot below.

And, once you have grasped the basics, you can use these principles to set up a useful spreadsheet of your own.



SPREADSHEET CHOICE

- Matrix-3: When loaded, you have a typical spreadsheet display of rows and columns. It is, however, three-dimensional - a sheet consists of rows and columns of up to 10,000 but with further layers or pages up to a maximum of 100. It can also be used as a normal 'flat file' spreadsheet. All facilities for creating and replicating formulae are provided and when entering data Matrix-3 can detect text or numeric input. It costs £109.25 from Cambridge Microsystems, 19 Panton Street, Cambridge, CB2 1HL.
- SigmaSheet: A well-known, fast and large-scale spreadsheet. Unfortunately Minerva has not developed this serviceable spreadsheet into a Risc OS product, although it can exchange data with other Minerva applications. It can also import data from Lotus 123 as well as ViewSheet and InterSheet. It costs £42 from Minerva, Minerva House, Baring Crescent, Exeter EX1 1TL. Tel: (0392) 437756.
- PipeDream: Not just a spreadsheet! It also functions as a word processor, database and spreadsheet. There is now a new release, PipeDream 4 with many added features. (Check next month's review in BAU for more details of this new release.) Pipedream 4 costs £196 and is available from Colton Software, 2 Signet Court, Swanns Road, Cambridge, CB5 8LA. Tel: (0223) 311881.
- !Calc : A fairly simple, multi-tasking Risc OS spreadsheet. It is limited to 56 columns by 100 rows, but that will cope with most needs. Although menus are used for some tasks !Calc does use the </> symbol to enter some commands. At present, it does not support the Acorn printer drivers, but this is promised. The number of functions are also due to be increased and purchasers are promised regular updates. It costs £20 from Colin Turnbull, 13 Woodhall Terrace, Juniper Green, Edinburgh EH14 5BR.
- Contex Spreadsheet: A very low cost entry into Archimedes spreadsheeting, it uses a BBC style Mode 7 screen and you have to define the size of the sheet before you start. Up to 26 columns by 900 rows are possible. Commands within the sheet are all single letters, and it does not automatically recalculate the values of formulae when any of the data is changed. It costa £15 from Contex Computing, 15 Woodlands Close, Cople, Bedford, MK44 3UE.
- Desktop Office: An integrated package covering wordprocessing, databases, spreadsheets, charts and graphs, and comms. The spreadsheet can be no more that 100 rows by 55 columns. Formulae can be arithmetic or trigonometric and ten other functions are provided. £85 from Minerva, as above.
- Schema: Often described as the definitive spreadsheet for the Archimedes, given enough memory a Schema spreadsheet can be up to 32000 rows by 32000 columns. All of the usual commands are provided as well as a wide range of functions. It is also possible to build your own functions. Schema can mimic DTP paragraph styles - used for display and printing - and offers a wide range of formats. It costs £114.89 from Clares, 98 Middlewich Road, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511.

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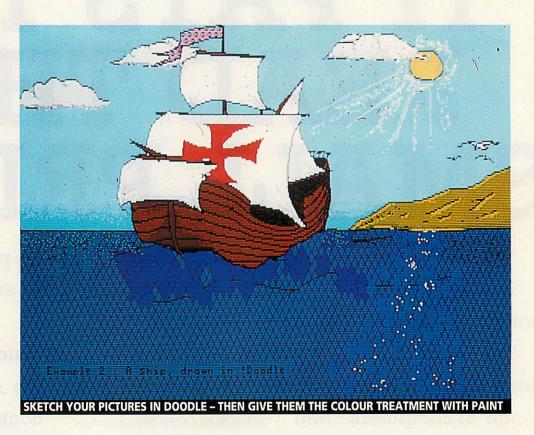
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Where else

Quick and easy drawing for everyone is the aim of this program by IAN WILSON, He explains why he took the plunge



GET THE DOODLE BUG

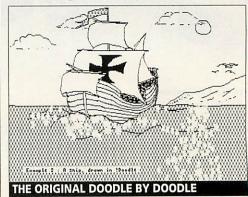
hen I was still an Electron user, I was invited round to a friend's house to admire his new Amstrad PC. Playing around with Gem, I was particularly amused by its drawing program, GemDraw. I won't say that this incident persuaded me to change my computer, but it did make me realise how outdated my trusty Electron had become. Some time later, I went down to my local Acorn dealer to look at the new A3000 and was amazed at the range and quality of software bundled with the machine. It was truly a package to pale my friend's Amstrad into insignificance.

Having made my purchase, I hurriedly took my new computer home, carefully followed the instructions and connected my old Citizen 120D printer. I had plenty of software to be getting on with and soon set about producing a small newspaper to distribute at work. To keep the costs low, I intended to print out the pages on my Citizen and then photocopy them. The Risc OS dot-matrix printer driver drove my Citizen to a standard of excellence, hitherto unknown to it, and I wondered why anyone would want to buy a DTP program when Paint, Draw and Edit were provided free? Unfortunately, the photocopier let me down, refusing to recognise the various shades of dotted blacks and greys which the Citizen proudly presented it with.

It didn't take very long for my own children to discover the pleasures of drawing with a mouse. However, Paint and Draw were very difficult for them to use, and the beauty of the Risc OS driver's output failed to capture their imagination - the length of time spent waiting for a hard copy, about 20 minutes, far exceeded their natural impatience.

I therefore decided that what was needed was a simple, quick-to-print, two-colour drawing program complete with pattern fills, whose output could be edited in Paint and Draw. 'Simple,' I thought.

I had already done it for the Electron, and now I had a mouse and Basic 5 to make life easier. Added to this, the screendump routine was already there, somewhere on the applications' discs. My first version was ready within minutes. It was pretty rudimentary and wasn't multi-tasking, but it did work.



Shortly after that, BAU published the Risc OS skeleton program (March 90) and I set about using this as a framework on which to bring Doodle to the desktop. What was to emerge was a delightfully addictive program, not unlike my memory of GemDraw.

I have to admit that I am just not a flow diagram person, so I stripped the skeleton program down to its bones which, incidentally, are still identifiable in the polling loop and menu structure, and began adding my Doodle code. The main window, and all other subsequent windows, were created in FormEd and finally the changing pointers were added.

I had a brief flirtation with Risc OS printer drivers, but the code was difficult and, with some relief, I decided that this method of print-

showing the pixel layout of the selected pattern. Click on a pixel to toggle its state. When you are happy, click on OK to transfer your pattern to the Pattern window. There are four available patterns to edit, chosen by clicking on the radio buttons at the top of the dialogue box. The option to save patterns is provided on the menu; if used, the patterns you have created will be available the next time you load the program.

ADDING TEXT

To add text to your doodle, select your system font from the menu. On re-entering the main window, the pointer will become a 'quill'; click anywhere in the window to make the text caret appear. Doodle will remain in text mode until you next press RETURN. For fine control over the

caret use the arrow keys. You can add your own favourite system fonts. To open the Doodle application directory, double-click on it while holding the SHIFT key down. There you will find a subdirectory, BBC fonts, to which any number of system font files can be added - they will then be available in Doodle.

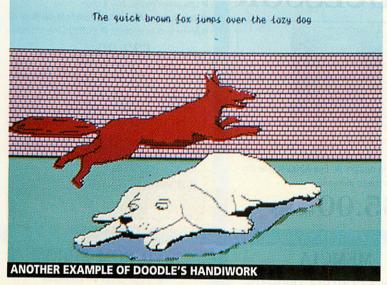
Although Doodle is a single document editor, you can have as many copies of the application on the bar as your icon memory will allow.

Moreover, each copy can have its own pattern definitions and its own system fonts.

Saving and loading your doodles is standard to Risc OS applications - drag the icon to where you want it saved, and drag it back on to Doodle to load. And that's all there is to it. As the output is in the form of a sprite file it can be used in other applications. For example, a doodle can be dragged into Draw for outline fonts to be added, or sized to fit into a DTP document. A doodle shrunk in this way has a rather satisfying sketchlike appearance.

The program can also be used to create a quick outline drawing which can be transferred to Paint, or another art package, for more complex editing. My SprEd application (December 91) can convert a doodle to a Mode 15 sprite, for example. This can then be loaded into Paint for the addition of colour using flood fills. This is how the ship was coloured. The picture of the fox and dog shown above was actually loaded into Revelation 2 to be coloured in. My children prefer to use their crayons on the printed hard

The program can be typed in from the yellow pages. The monthly disc version includes some sample system fonts plus my own system font designer, as a bonus. And, once you have put Doodle to the test, send in the results to the BAU monthly graphics column - the address is on page 17 - and the best one received will find its way into print!



ing would defeat the object of the program which was to provide a quick hard copy. In any case, if the user wanted a Risc OS printout, it would be easy to transfer the doodle to Paint and print it out from there.

HOW TO DOODLE

The final program has an innocent, childlike character and my children use it to create their own pictures to colour in. In use, Doodle is fairly intuitive. To install it on the icon bar double-click on its icon in the directory window; click on the icon bar to open the main window. When the pointer enters the main window it becomes a 'pencil', indicating that you are ready to doodle. To draw a line, hold down Select and move the mouse; hold down Adjust, and the 'pencil' becomes an 'eraser'.

Pattern fills are achieved by dragging a pattern from the pattern window to any enclosed area of your doodle. It is important to ensure that the area to be filled is securely bordered, or the pattern will leak into the rest of the doodle with disastrous consequences. If in doubt, save your doodle first! An interesting effect of extended colour fill (ECF) patterns is that they can be mixed in a doodle by dropping a new design between the elements of a pattern already in the doodle.

It is possible to re-define the pattern fills. The pattern designer can be found within the Pattern submenu. This dialogue box displays a grid,

THE LISTINGS

A doodle is a Mode 0 sprite which exactly fills the main window of the program. Doodling is achieved by diverting VDU output to that sprite (SWI OS_SpriteOp 60), updating the area of the screen where the pointer has moved and finally transferring the VDU output back to the screen. A potential problem with this method is that the VDU state of the sprite has to remain intact between polling loops, but fortunately Risc OS provides a solution in SWI "OS_SpriteOp 62" which defines a save area for the VDU state of the sprite.

The program uses the module HardCopy from the Apps Disc two. This module will need to be copied into the !Doodle directory. The module normally produces a screendump, but can be fooled into printing a sprite, again by diverting VDU output.

By now, all that was needed to produce a usable program were the routines for saving and loading. These routines are conspicuously absent from the skeleton program but are comprehensively covered in the programmers reference manual under SWI Wimp_SendMessage. To ensure that it is displayed in Draw with a white background, rather than grey, the sprite has to include its own palette information.

The addition of system fonts presented two difficulties that had to be solved. Firstly, the menu structure had to cope with any number and variety of system fonts owned by the user and secondly, when a system font was chosen for Doodle, the character set for the rest of the system was to remain unaffected. The SWI "OS_GBPB" is repeatedly called to read the filenames in the fonts directory and each filename is added to the menu. The second problem was more tricky. The solution was to store the character definitions in memory without affecting the VDU driver and then, when a character is typed, read its current definition with "OS_Word 10", redefine the character, write it to the sprite, and finally define it as it was before.

The pattern designer was the last feature to be added to the program; the code is fairly simple but it did involve some careful use of FormEd.

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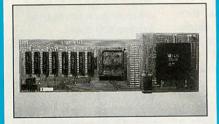
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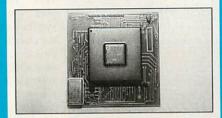
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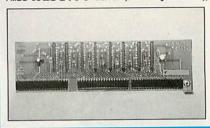
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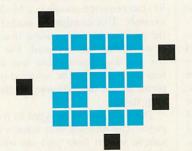
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RISCY BUSINESS

f you have been thinking of buying a secondhand A3000 or Archimedes, now is a good time. With the arrival of the A5000, many Archimedes owners will be upgrading to the new machine - and that could be good news for bargain hunters. But where do you start looking? Well, the free ads pages of this magazine might be a good start (see next month's issue). Alternatively, many dealers may be taking Arcs in part-exchange for the new machine, so it is worth contacting a few. But what should you look for in a secondhand machine? And how do you know a bargain when you see one?

THE BARGAIN BUY

First impressions are important. Is the machine clean and well presented? Has it been looked after, or is it showing signs of wear and tear over and above its age? Obviously, try and see the machine up and running, and run a handful of applications to see that all the hardware is functioning correctly.

If you're presented with a dead machine it is quite likely to be a dodgy power supply. A new one will set you back about £70. Check that the keyboard is clean and that all the keys work: in most environments it is possible that dust, crumbs and coffee will get under the keys and stop them working properly. Not to mention cat hairs under the Caps Lock...

Likewise, a large build up of dust on the PCB (Printed Circuit Board) may lead to short circuits and other problems - a good clean with a tooth brush or paint brush does the machine a world of good. In particularly bad cases you may need to use a switch cleaning spray as well. Very old machines may also be prone to oxidisation on the chips' pins. If nothing else seems to work, carefully extracting all the chips and pushing them all back in again may revitalise a dead machine. If the machine is fitted with a fan, check that the filter is clean. You will need a fan if you are planning to fit a hard disc. A new one will cost roughly £20.

Disc drives are prone to two problems: mechanical failure (such as dirty heads, head misalignment), and fitting difficulties. Older machines are fitted with Sony drives, recognisable by the fact that they are wider on the right hand side and the eject button is next to the LED. These models often do not sit exactly 'true' with the front fascia panel which can lead to 'disc not present' errors, but putting a small piece of cardboard under the mounting bracket normally solves the problem.

Newer machines (400/1, 3000 and 5000 series) have Citizen drives (LED on the left, wide part of slot in centre) that don't suffer from the same problem. Citizen drives, however, do not automatically sense when a disc is inserted.



THE SECONDHAND ARC: WHAT DO YOU REALLY **GET FOR YOUR MONEY?**

Give all the connectors a good jiggle, particularly the mouse and keyboard plugs. The sockets can be weakened from constant insertion and removal of the plugs: these cost around £5 to replace. It is also worth checking the video lead and the cart socket on the monitor. If the picture occasionally changes colour, there is probably a dodgy wire in the lead.

Two designs of mice have been supplied with the Archimedes, the older Amp style (flat, sloping buttons) tend not to be as good as the newer Logitech types (bevelled buttons). The older mice tend to slip more and really need a mouse mat. In both cases it is a good idea to take the ball out occasionally to clean it.

If you are buying your machine from a dealer, ask to see the Acorn Inspection Disc running. This goes through various checks on the machine to see if there is anything wrong with it. Most dealers should have a copy of this and will be happy to demonstrate that all is well. Also ask to see that the machine has had all of its Field Change Orders carried out.

Acorn sends out a list of the various modifications that should be carried out on all machines - these include things like the serial

Take the risk out of buying a secondhand Archimedes by following DAVE LAWRENCE'S practical advice



Below is a guide to the value of secondhand A3000 and Archimedes machines. However, please note that prices may vary considerably, according to age and condition of the equipment, and whether it is being sold privately or by a dealer.

The best deals can often be made privately, but a reputable dealer may be more reliable and able to offer a guarantee on parts and labour should anything go wrong. As always, be prepared to shop around.

• A3000£400
Plus monitor & software£550
● A310£250-£300
Plus monitor & software£400
● A410£350-£400
• A410/1£450
Plus Arm3, 50Mb hard disc£800
• 20Mb hard disc£100
● 40Mb hard disc£150
Power supply£70
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• Disc drive£40
 MemC1A chip£50
• VidC chip£40

chip and the parallel printer port in very early machines. It is well worth taking a secondhand machine to a dealer and having it checked over for these changes.

Check the screen display and sound system closely. If the picture seems unstable or it not there at all, or if the sound system is crackly, it is likely that the video chip (VidC) needs to be replaced. This will set you back about £40.

Plugging in and unplugging a monitor from the computer while both are switched on can cause the VidC to be zapped by static. The 400/ 1 series machines have static protection and it is very unlikely that the VidC will be damaged. A static protection kit for 300/400s is available for £5 from Ray Maidstone, tel: (0603) 400477.

UPGRADING

It is quite likely that you will actually be buying more than just the base computer, so it is worth taking the lid off and seeing what other goodies you are getting. The 400 series machines may well have a hard disc (300 series machines need a backplane and podule for this).

If there is a hard disc, check that it verifies successfully, preferably after being switched on for an hour or two. I have mentioned backplanes, which you will need if you want to fit any expansion podules. If there is one present on a machine you are thinking of buying, see if it is a 2-slot or 4-slot. The latter may well be more suitable for your needs. New ones are roughly £25 and £40 respectively.

See if any expansion Ram has been fitted. The 400/1 series machines allow Ram to be added very easily, while 300 series models need various carrier boards to be soldered or plugged in. Again, the latter may be more suitable.

If you are looking at an A3000, have a close look at the Ram expansion pins - they should look clean, shiny and bright. Some A3000s have oxidised pins, which means that Ram cards may not work properly.

The pins can be cleaned with a piece of fibreglass - ask a dealer to do this for you if necessary. If expansion Ram is already present, try wobbling it slightly with the machine on. If you get 'address exceptions' or 'abort on data transfers' errors, it is likely that the board has not been fitted properly.

Other expansions to look out for are as follows. A MemCla is the improved memory controller that speeds up the machine slightly. It is necessary if you are planning to fit an Arm3 and you will save £50 or so, if there is one already there. An Arm3 is a major advantage in terms of processing speed and can add about £150 to the price. An Econet card is really useful if you have a network. If you have a multisync monitor, a VidC enhancer is useful

As a rough guide, any podules fitted, (digitisers, samplers, I/O, Midi and so on) will be worth anything between 60 and 80 percent of their 'new' price.

CONCLUSION

If you shop around, you can probably track down quite a bargain. At the end of last year, I found one myself - an A310 with a backplane, fan and hard disc podule for just over £300 -£100 less than my original BBC B.

It is worth remembering that the computer itself may not be worth as much as the expansion and podules it contains: to give you something to go by, there is a list of average prices shown in the box on this page. These are by no means the final word, but they should give you a rough idea. Happy bargain hunting!

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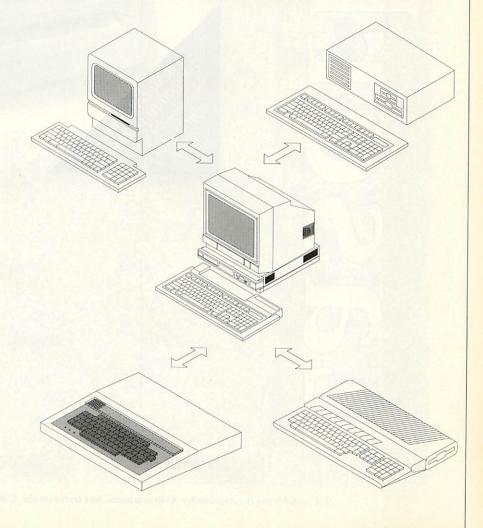
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Not suitable for the Archimedes A540 machines. Not tested on the A5000.

Fax: 0442 231632

he picture seen below was not created by an abstract artist using a painting package: it was generated entirely from a mathematical formula and a few values set by the user. Simply by entering a few letters into the program, (found in yellow pages or on our monthly disc), you can create such a world and explore its depths by zooming in on areas using the mouse.

Apologies to eight-bit owners, but so much maths is needed to make the pictures they would take days to complete on a BBC B or Master 128. In fact the original program, written in Basic, took 20 hours even on an Archimedes.

To speed things up, the program is machine coded and has a fast mode with reduced accuracy. It also uses the technique of successively increasing the resolution of the picture (rather than working from left to right, for example), so you needn't wait for the finished picture while you are exploring.

When the program is run, it starts drawing a picture straight away. The co-ordinates, sequence and estimated time of completion are shown on the right hand side of the screen. To stop the plot, press ESCAPE. A box, which can be moved with the mouse, will appear on-screen. Pressing Select makes the box smaller, Adjust makes it larger, and Menu starts the plot of the chosen area. The plot can also be started by pressing F (for Fast); this uses less accurate (16bit) multiplications to draw the picture more quickly, though with a slight loss of quality.

While the box is on-screen, press s to save the picture to disc (the box will be removed first), E to exit the program or R to reset the sequence. coordinates, and initial value of x. Pressing RETURN at any of the prompts causes the program to use the defaults shown on-screen.

The sequence can be entered in the form ababb or 01011. The program only looks at the bottom bit of the characters entered, so enter your name, for example, and see what happens.

THE LISTING

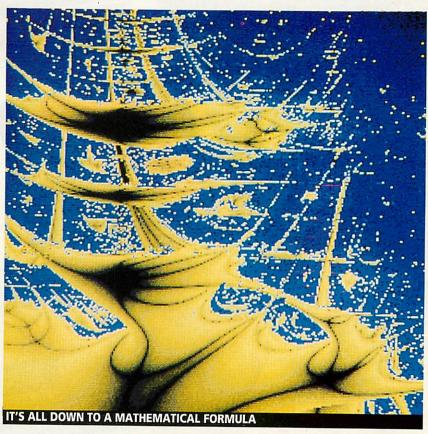
The algorithm is based on a modified form of what is known as the Verhulst or logistic formula, intended as a simple model for the animal population of an isolated area. The rule is:

 $x_{\text{new}} = r x_{\text{old}} (1 - x_{\text{old}})$

x_{new} represents the population of a species (as a proportion of the largest population the area can sustain); x_{old} represents the size of the population the previous year. The system's behaviour depends on the value of r; when it is large enough, x behaves chaotically, changing seemingly at random. This means that although a sequence of values of x can be calculated exactly, they cannot be predicted in any other way, and a small change in the initial value of x will make the sequence look totally different further on. The program Verhulst draws a graph of 100 sequential values of x against r. It shows the number of population levels starting at one, but doubles repeatedly as r increases and becomes chaotic.

One way to measure how chaotic a system is, is to calculate its Lyapunov exponent. This is a kind of average logarithm of the changes in x, which is less than zero for a stable system, and greater than zero for a chaotic system. The program draws a graph of an approximation to

PAINTING BY NUMBERS



Create stunning landscapes, using a fractal program from MICHAEL **ATTENBOROUGH**

the Lyapunov exponent against r on the bottom half of the screen.

The picture above was created by doing the same thing, but with two values for r, say a and b. These are used in a sequence, for example a,a,b,a,b - which is used repeatedly in calculating several thousand values of x. The pictures produced by the program Lyapunov are plots of the Lyapunov exponent against a and b. Each point on the screen corresponds to a pair of values for a and b, and the colour of the point indicates the value of the Lyapunov exponent. Negative values (showing stable behaviour for x) are yellow, shaded down to black for lower values (greater stability in x). Positive values are shown in shades of blue. If x leaves the range zero to one, the point is coloured in dark red.

Although the pictures look three dimensional, they are not - it is an effect caused by the shading, and the fact that some features appear to go in front of others. This seems to be determined by the initial value of x. If your Archimedes has enough memory, you could save a series of plots of the same area, with a range of values for the initial x, and write a small program to load and animate them.

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RISC OS Euclid is the best multi-tasking 3D graphics and animation system for the Archimedes. It is effectively a 3D version of Draw.

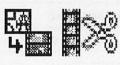
Mogul makes full use of Euclid's unique hierarchical data structure to generate animations of 3D objects with articulated motion and simultaneous camera motion.

ArcLight is a multi-tasking ray-tracer which will generate a realistic Euclid picture, or a complete Mogul film, while you are free to get on with other work.









Tween produces films from Draw files. It uses techniques similar to Mogul and generates a film by calculating intermediate frames from a set of key positions.

Splice allows you to edit films produced by Mogul or Tween. You can even produce hand-drawn cartoons by converting sprites from any source.



Such is the enthusiasm for **Euclid** there is a user group called **Elements**, now in its second year, which provides a quarterly disk containing hints, tips, animations and user pictures.

ArcLight £50
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Mogul £20
Splice £30
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		B+	128	128	Compact		Turbo			Ram	A3000/A5000	disc
★Info	49									HEND		
Listing 1	Project of											
Listing 2 - 3					100							
Listing 4 - 5					A Part							
Listing 6												
Listing 7												
Listing 8	NAME OF			BY WELL								
Listing 9										-		
Lisiting 10						100						
Listing 11- 13												
A to Z	60											
Doodle	72											
Lyapunov Fractals	79											

*Info

```
710 DATA 170, Density, 6, 16, 24
720 DATA 140, Scale, 6, 16, 24
730 DATA 110, Draw, 4, 5, 16
Listing 1
                                                                                                                                                                                                                                                                                                                                                                                                                     2186 .edges FNsetmfstep(j)
2190 MOV RI,#1
1-2*loop-1
2200 MOV i,R1,83L loop
2210 SUB i,i,#1
2220 .eloop FMhav(0)
2230 FNhav(0)
2230 FNhav(0)
2250 FNvav(0)
2250 FNvav(0)
2250 FNvav(0)
2250 FNvav(0)
2250 FNvav(0)
2260 SUBS i,i,#1
2270 BPL eloop
2280 ADD loop,loop,#1
2290 LDR RØ,Scale
2300 CMP loop,R0
2310 BNE edges
2310 BNE edges
2310 MOV loop,#0
                                                                                                                                                                                                                                                                                                                                                                                                                                         .edges FNsetmfstep(j)
MOV R1,#1
                                                                                                                                                                                                                                                                                 1460 c=GET
1470 IF c=127 AND file$<>"" VDU 127:fil
         10 REM >McCloud (Info1) - 32 bit clou
                                                                                                                                                                                                                                                                             1470 IF c=127 AND file$<."" VDU 127:fil
e$=LEFT$(file$)
1480 IF c>32 AND c<127 AND LENfile$<21
file$+CHR$c:VDU c
1490 UNTIL c=13
1500 OFF
1510 IF file$<."" THEN
1520 SYS "XOS SpriteOp", £10C, sprite$, fi
le$ TO err :flag
1530 IF file$ AND 1 THEN
1540 VDU 28,1,30,30,30,12,26,31,1,30
1550 1=4:REFEAT:VDU err?!:i+=1:UNTIL er
r?i=0
                                                                                                                                               750 DATA 4,Exit,15,2,10
        20 REM By Dave Lawrence
30 REM Based on an idea by Andrew Jon
                                                                                                                                               770 DEF PROCelab(x1,y1,x2,y2,cm,ct1,cb
     30 REM Based on an idea by Andrew Jon

40 REM 32 bit only
50 REM (C) BAU February 1992
50:
70 MODE 9:0FF
80 PROCInit
90 PROCascreen
100 PROCassemble
110 PROCalouds(weather,density,scale)
120 REPEAT
130 MODES x,y,z
140 If z=0 THEN
150 time=0
150 ELSE
170 IF z AND 5 THEN
180 IF TIMENtime+10 THEN
190 box=PNFind(x,y)
200 add=(z AND 1)-x0)-((z AND 4)<x0)
210 CASE box OF
220 WHEN 1 : PROCadjust(1,weather,add,
                                                                                                                                        r)
780 GCOL C
                                                                                                                                            780 GCOL cm
790 RECTANGLE FILL x1,y1,x2-x1,y2-y1
800 GCOL ctl
810 MOVE x1,y1:DRAW x1,y2:DRAW x2,y2
820 GCOL cbr
830 DRAW x2,y1:DRAW x1,y1
840 ENDPROC
850 :
860 DEF PROCtext(n,ypos,text$,ct,spc,h
ioht)
                                                                                                                                                                                                                                                                                 1560 VDU 7
1570 IFINKEY200
1580 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                         2320 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                      2330 middle FNsetmfstep(step)
2340 MOV i,#1
i=2^loop-1 (*step)
                                                                                                                                              870 PROCslab(1024+12, ypos*4, 1279-12, (y
                                                                                                                                       870 FROCSIAD(1024+12, ypos*4,1279-12, (yposheight)*4,12,14,10)
880 WAIT:VDU 5
880 GCOL ct:MOVE 1024+((1280-1024)-LEN
text$*32).72, (yposhspc+6)*4:FRINTtext$
900 VDU 4:OFF
910 x1(n)=1024+12+4:x2(n)=1279-12-4
920 y1(n)=(yposh-1)*4:y2(n)=(yposheight-1)*4
                                                                                                                                                                                                                                                                              1600 IF scale=8 THEN
1610 SYS "OS_SpriteOp", £122, sprite%, "cl
oud", pos*4, pos*4
1620 ELSE
1630 GCOL 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                               i,i,ASL loop
i,i,#1
                                                                                                                                                                                                                                                                                                                                                                                                                                                              i,i,ASL step_asl
                                                                                                                                                                                                                                                                                                                                                                                                                         237Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                                       1630 GCOL 0
1640 RECTANGLE FILL 0,0,1023,80
1650 ENDIF
1660 MOUSE ON
1670 ENDPROC
                                                                                                                                              93Ø ENDPROC
       230 WHEN 2 : PROCadjust(2,density,add,
                                                                                                                                        940:

950 DEF FNfind(fx,fy)

960 box=FALSE

970 FOR i=1 TO boxes

960 IF fx>x1(i) AND fx<x2(i) AND fy>y1

(1) AND fy<y2(i) box=i

990 NEXT

1000 =box

1010:
0,20)
240 WHEN 3 : PROCadjust(3,scale,add,1,
                                                                                                                                                                                                                                                                                                                                                                                                                     2430 :

2440 .jloop1

2450 FNij(FALSE)

RØ =average

2460 ADD i,i,step

2470 FNij(TRUE)

2480 ADD j,j,step

2490 FNij(TRUE)
                                                                                                                                                                                                                                                                                 1690 DEF PROCassemble
1700 loop=4
1710 i=5
1720 j=6
      250 WHEN 4 : drawn=FALSE
260 WHEN 5 : PROCeave
270 WHEN 6 : done=TRUE
280 ENDCASE
                                                                                                                                                                                                                                                                                  1740 seed=8
       290 time=TIME
                                                                                                                                            1010 :
1020 DEF PROCvalue(box, value)
                                                                                                                                                                                                                                                                                 1750 sqr=9:step=9
1760 step_asl=10
1770 mf=11
                                                                                                                                                                                                                                                                                                                                                                                                                         2500 SUB i,i,step
2510 FNij(TRUE)
                                                                                                                                         1020 DEP PROCValue(box,value)
1030 v$=STR$Yalve
1040 IF box=2 THEN
1050 v$=RIGHTS("0"+v$,2)
1050 v$=RIGHTS("0"+v$,2,1)
1070 ENDIF
1080 WAIT
1080 WAIT
1080 GCOL 12:RECTANGLE FILL X1(box),y1(box),1280-1024-36,36
1100 VDU 5
1110 COL 2:MOVE X1(box)-16+((1280-1024)-1280-1024)
1120 VDU 4:OFF
1130 ENDERGO
1140 :
       300 ENDIF
                                                                                                                                                                                                                                                                                1770 mf=11
1780 grid=12
1790 sp=13:link=14:pc=15
1800 SHIFT=10
1810 MULTAL-cSHIFT
1820 colmin=1
1830 colmax=15
1840 FOR pass=0 TO 2 STEP 2:P%=code
1850 [OPT pass
1860 .clouds STMFD (sp)!,(link)
1870 LDR grid,Grid
1890 LDR xor.Xor
1890 LDR seed,Seed
1900 MOV R0,#0
1910 MOV R1,grid
320 ENDIF
330 F( z AND 2)=8 AND NOT drawn PROCC
louds (weather, density, scale)
340 UNTIL done
350 MODE 9
360 END
370 :
380 DEF PROCINIT
390 weather=7
400 density=3
410 scale=8
420 done=FALSE
430 READ boxes
440 DIM x(boxes), x2(boxes), y1(boxes),
       320 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                         2530 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                     2540 ADD R
R1,R2 -> middle
                                                                                                                                                                                                                                                                                                                                                                                                                                                               R2,i,step,ASR #1
                                                                                                                                                                                                                                                                                                                                                                                                                      RI,R2 -> middle
2550 ADD R3,j,step,ASR #1
2560 FNplot(2,3)
2570 SUBS j,j,step
2580 BPL jloopl
2590 SUBS i,j,step
2600 BPL iloopl
2610 CMP loop,#0
2620 BEQ noother
2630 MOV R3,#2
                                                                                                                                                                                                                                                                                                                      R1,grid
R2,count
STR
       440 DIM x1(boxes),x2(boxes),y1(boxes),
                                                                                                                                            1150 DEF PROCadjust (box, RETURN var, add,
                                                                                                                                                                                                                                                                                                                                                                                                                     R3=(-)add
2640 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                               step, step, ASR #1
 y2(boxes)
450 DIM code 4096-8,grid% 260*260,spri
                                                                                                                                       min, max)
                                                                                                                                                                                                                                                                                  1920 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                              step_asl,step_asl,#1
i,#1
                                                                                                                                         1160 old-var
1170 var+add
1170 var+add
1180 IF varmin var=min
1190 IF varmin var=min
1190 IF vdi-var THEN
1200 IF old-var THEN
1210 PROCValue(box,var)
1220 drawn=FALSE
1230 ENDIF
1240 ENDPROC
1250 :
1260 DEF PROCClouds(W,D,S)
1270 MOUSE OFF
1280 IMeather=W
1290 IDensity=[D/10]*MULT
1300 IScale=S
1310 ISeed=TIME
1330 CALL clouds
1330 drawn=TRUE
                                                                                                                                           1160 old=var
                                                                                                                                                                                                                                                                                                                                             RØ, [R1],#4
                                                                                                                                                                                                                                                                                                                                                                                                                        265Ø SUB
450 DIM code 4095-8,grid% 260*260,8
to% (256*256)/4:1024
460 !sprite%=(256*256)/2+1024
470 sprite%!8=16
480 SYS "OS_SpriteOp",£109,sprite%
490 ENDPROC
                                                                                                                                                                                                                                                                                                                       R2, R2, #1
                                                                                                                                                                                                                                                                                 1940 SUBS
                                                                                                                                                                                                                                                                                                                                                                                                                         2660 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                     2000 MOV i,#1
i=2^(loop+1)-1 (*step)
2670 MOV i,i,ASL loop
2680 MOV i,i,ASL #1
2690 SUB i,i,#1
2700 MOV i,i,ASL step
2710 :
                                                                                                                                                                                                                                                                                 1950 BNE
                                                                                                                                                                                                                                                                                                                       RØ, Scale
                                                                                                                                                                                                                                                                                  1960 LDR
                                                                                                                                                                                                                                                                                                                 *density
RØ,RØ,#1
R1,Density
mf,RØ,R1
                                                                                                                                                                                                                                                                                                                                                                                                                                                              i,i,ASL step_asl
       500 EF PROCacreen
520 FOR col=1 TO 8
530 COLOUR col,(col+3)<<4,(col+3)<<4,&
                                                                                                                                                                                                                                                                                                                                                                                                                       540 NEXT

550 FOR col=0 TO 6

560 COLOUR col+9,(14-col)<<4,(14-col)<<4,(14-col)<<
                                                                                                                                                                                                                                                                                                                      RØ,Scale
sqr,sqr,ASL RØ
RØ,sqr,#256
       570 NEXT
580 PROCslab(1024,0,1279,1023,13,11,15
                                                                                                                                                                                                                                                                                                                     grid,grid,RØ
grid,grid,RØ,ASL #2
grid,grid,RØ,ASL #8
                                                                                                                                            1330 drawn=TRUE
                                                                                                                                                                                                                                                                                 2070 ADD
2080 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                         2820 ADD i,i,step
2830 ADD j,j,step
2840 FNij(TRUE)
       600 READ y,t$,c,s,h
610 PROCtext(i,y,t$,c,s,h)
                                                                                                                                            135Ø ENDPROC
                                                                                                                                                                                                                                                                                                                     RØ, Weather
                                                                                                                                       1350 : 1370 DEF PROCRAVE
1370 DEF PROCRAVE
1380 pos=(256-2°scale)/2
1390 SYS "OS SpriteOp",&110,aprite%,"cl
oud",1,pos*4,pos*4,1023-pos*4,1023-pos*4
1400 PROCRIAb(12,12,1023-12,80,13,11,15
                                                                                                                                                                                                                                                                             plot corners
2090 FNplot(0,0)
2100 LDR R0,Weather
                                                                                                                                                                                                                                                                                                                                                                                                                        2850 SUB j.j.step,ASL #1
2860 PMij(TRUE)
2870 ADD j.j.step
       630 PROCvalue(1,weather)
640 PROCvalue(2,density)
650 PROCvalue(3,scale)
660 ENDPROC
670
                                                                                                                                                                                                                                                                                2100 LDR RØ, Weather
2110 FNplot(sqr,0)
2120 LDR RØ, Weather
2130 FNplot(Ø,sqr)
2140 LDR RØ, Weather
                                                                                                                                                                                                                                                                                                                                                                                                                         288Ø :
289Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                                        2890 MOV RØ,RØ,ASR #2
2900 FNplot(i,j)
2910 SUB j,j,step,ASL #1
2920 CMP j,step ;,ASL #1
                                                                                                                                          1410 MOUSE OFF:ON
1420 COLOUR 128+13:COLOUR Ø
1430 PRINTTAB(1,30);"Filename:";
       680 DATA 6
690 DATA 242,CLOUDS,1,2,10
700 DATA 200,Weather,6,16,24
                                                                                                                                                                                                                                                                                 2150 FNplot(sqr,sqr)
2160 MOV loop,#0
                                                                                                                                                                                                                                                                              calc edges
```



1510 LDA addr2

```
320 JMP peek
330 JMP trans
340 :
350 .poke
360 CMP #16
370 BCC aok
380 CMP #128
390 BCC setto15
400 LDA #1
410 BNE aok
                                                                                                                                                                                                                                4858 MUL mf,R1,mf

4868 SUB step_asl,R0,loop

step=2'(scale-loop)

4878 MOV Rl,#1

4888 MOV stepreg,R1,LSL step_asl

4898 ]

4100 = ""
   2930 BGE
2940 EOR
2950 SUB
                                                                     jloop2
R3,R3,#3
i,i,step
i,#1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1520 STA write
1530 LDA addr2+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1530 LDA addr2+1
1540 STA write+1
1550 LDA #7
1560 STA readrow
1570 .writeloop
1580 LDA #6
1590 STA writerow
1600 .rowloop
1610 LDY readrow
1620 LDA (read),Y
1630 PLA
       2960 CMF
                                                                       iloop2
       297Ø BGE
       2980 :
       2990 .noother
                                                                                                                                                                                                                                   4100 = 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 4110 : 41
                                                                     loop, loop, #1
       3010 LDR
                                                                     RØ, Scale
         3020 CMP
                                                                     loop, RØ
middle
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          420 .setto15
430 LDA #15
         3030 BNE
      3030 BNE middle
3040:
3050 :zap
3060 STR seed, See
3070 MOV RO,#19
3060 SNI "XOS_Byt
3090 LDR R12,Grid
3100 MOV R11,R1,R1,
3120 LDR R1,R1,R1,
3120 LDR R10,Scre
3140 Jbot LDMIA
3140 J
3150 FOR reg=0 TO 3
                                                                                                                                                                                                                              440 .aok
450 PHA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1630 PHA
1640 AND #&F
                                                                 seed, Seed
RØ, #19
"XOS_Byte"
R12, Grid
R11, #256*(256/32)
R11, R11, #1
R1Ø, Screen
LDMIA R121, (RØ-R7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         460 LDA #0
470 STA addr+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1650 TAX
1660 LDA cols1,X
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       470 STA addr+1
480 TXA
490 LSR A
500 PHP
510 ASL A
520 ASL A
530 ROL addr+1
540 ASL A
550 ROL addr+1
560 PHA
570 TYA
580 LSR A
600 LSR A
600 LSR A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1670 STA col:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1680 LDA cols2.X
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1690 STA CO12
1700 PLA
1710 LSR A
1720 LSR A
1730 LSR A
1750 TAX
1750 TAX
1760 LDA CO182,X
1770 ASL A
1780 ORA CO11
1790 LDY writerou
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1690 STA col2
     3150 FOR reg=0 TO 3
3160 (DPT pass
3170 AND R9,(2*reg),#60000000F
3180 AND R8,(2*reg),#6000000000
3180 AND R8,(2*reg),#60000000000
3190 ORR R9,99,88,LSR #3
3220 AND R8,(2*reg),#600000000
3230 ORR R9,89,R8,LSR #12
3220 AND R8,(2*reg),#600000000
3230 ORR R9,99,R8,LSR #12
3240 AND R8,(reg*2+1),#600000000
3250 ORR reg,R9,R8,LSL #16
3260 AND R8,(reg*2+1),#600000000
3270 ORR reg,reg,R8,LSL #1
3280 AND R8,(reg*2+1),#600000000
3270 ORR reg,reg,R8,LSL #1
3280 AND R8,(reg*2+1),#600000000
3290 ORR reg,reg,R8,LSL #3
3200 AND R8,(reg*2+1),#600000000
3210 ORR reg,reg,R8,LSL #4
3320 NEXT
                                                                                                                                                                                                                              4399 MOV R0, R1, ASR #1
R0=av
4300 MOV R2, i, ASL #1
4310 ADD R2, R2, #1
4320 MOV R2, R2, ASL step_asl
4330 MOV R2, R2, ASL step_asl
4340 PMplot(2, yy)
?(i+0.5, y)=R0
4350 ]
4350 ]
4350 =""
4370 :
4380 DEF FNVav(xx)
4390 [OPT pass
4400 MOV R2, i, ASL #8
4410 ADD R2, R2, i, ASL #2
4420 ADD R1, grid, R2, ASL step_asl
4430 ]
   1790 LDY writerow
1800 STA (write),Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       618 TAX
628 PLA
628 PLA
630 CLC
640 ADC linelo, X
659 STA addr
659 LDA linehi, X
670 ADC addr
670 ADC addr
670 ADC addr
670 ADC addr
770 ADD TAX
710 TAX
710 TAX
710 TAX
720 LDX #EF0
730 PLP
740 PLA
759 BCS noael
760 ASL A
770 ASL A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          610 TAX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1810 LDA cols1,X
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1820 ASL A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1830 ORA col2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1848 INT

1850 STA (write),Y

1850 DEC readrow

1870 DEC writerow

1890 DEC writerow

1890 BPL rowloop

1900 LDA addr

1910 STA write

1920 LDA addrel

1930 STA write

1930 STA write

1940 LDA readrow

1950 CMP #255
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1840 INY
                                                                                                                                                                                                                                       4430 ]
4440 IF xx=0 THEN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1960 BNE writeloop
1970 LDX #read
1980 JSR add8
1990 LDX #addr
                                                                                                                                                                                                                                      4450 [OPT pass
4460 LDRB RØ, [R1]
                                                                                                                                                                                                                                       4470 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           790 ASL A
800 LDX #&0F
                                                                                                                                                                                                                                  4480 ELSE
4490 [OPT pass
4500 LDRB RØ,[R1,xx]!
4510 ]
4520 ENDIF
4530 [OPT pass
4540 LDRB R1,[R1,j] ; (j=step)
4550 ADD R1,R1,R0
4550 ADD R1,R1,RR #1
4570 MOV R2,I,ASL #1
4580 ADD R2,R2,#1
4590 MOV R2,R2,ASL step_asl
4600 MOV R2,R2,ASL step_asl
4600 MOV R2,R2,ASL step_asl
4610 FNplot(xx,2)
                                                                                                                                                                                                                                       448Ø ELSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         800 LDX #&0F
810 .nose1
820 STA val
830 STX temp
840 LDA (addr),Y
850 AND temp
860 CRA val
870 STA (addr),Y
880 RTS
890 :
900 :
901 LDA #0
920 STA addr+1
930 TXA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2000 JSR add8
2010 LDX #addr2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2018 LDX #addr2
2020 JSR add8
2030 DEC col
2040 BHE colloop
2050 DEC line
2050 EMI done
2070 JMP lineloop
2080 Jdne
2090 RTS
2100 :
2110 .add8
2120 LDA #8
2130 CLC
         3500 :
3510 | NEXT
3520 SYS "OS_ReadVduVariables", Screen, S
     creen
3530 ENDPROC
                                                                                                                                                                                                                                         4610 FNplot(xx,2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           930 TXA
940 LSR A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2130 CLC
2140 ADC £00,X
2150 STA £00,X
2160 BCC a8rts
2170 INC £01,X
          3540
                                                                                                                                                                                                                                         4620 ]
4630 =""
          3550 DEF FNplot(xx,yy)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    950 PHP
950 ASL A
950 ROL addr+1
990 ASL A
1000 ROL addr+1
1010 PHA
1020 TYA
1030 LSR A
1050 LSR A
1050 LSR A
1050 HSA
1070 PLA
1070 STA addr
1110 LDA linehi, X
1120 ADC addr+1
1140 TYA
1170 LDA
1170 LSR A
1210 LSR A
  13550 DEF PMplot(xx,yy)
13560 (DPT pass
1570 MOV R1,#0 R12-PMD(1)
13580 )FOR bit=1 TO SHIFT+1:[OPT pass
1590 MOVS seed,seed,LSL #1
1600 EDRCS seed,seed,xor
1610 ADC R1,R1,R1
1620 ]HEXTY:[OPT pass
1630 SUB R1,R1,#1 *MULT ;
                                                                                                                                                                                                                                         4640 :
                                                                                                                                                                                                                                         4650 DEF FNij(add)
                                                                                                                                                                                                                                      4550 DEF FN1j(add)
4660 [OPT pass
4670 ADD R1,i,j,ASL #8
4680 ADD R1,R1,j,ASL #2
4690 ]
4700 IF add THEN
4710 [OPT pass
4720 LDRB R1,[grid,R1]
4730 ADD R0,R0,R1
4740 ]
4750 ELSE
4760 [OPT pass
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2170 INC &01,X
2180 .a8rts
2190 RTS
2200 :
2210 .cols1 EQUS STRING$(16,CHR$0)
2220 .cols2 EQUS STRING$(16,CHR$0)
2230 :
2240 EQUB &00:EQUB &01:EQUB &04:EQUB &04

         3630 SUB R1,R1,#1 *MULT ;
-1
3640 MUL R1,mf,R1 ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2250 EQUB &10:EQUB &11:EQUB &14:EQUB &1
         *mf
3650 MOV R1,R1,ASR #SHIFT
3660 ADD R1,R1,#0.5 *MULT
                                                                                                                                                                                                                                      4750 ELSE
4760 [OPT pass
4770 LDRB R0,[grid,R1]
4780 ]
4790 ENDIF
4800 =""
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2260 EQUB &40:EQUB &41:EQUB &44:EQUB &4
       +0.5
3670 ADD RØ,RØ,R1,ASR #SHIFT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2270 EQUB &50:EQUB &51:EQUB &54:EQUB &5
          3680 CMP RØ,#colmin
3690 MOVLT RØ,#colmin
3700 CMP RØ,#colmax
3710 MOVGT RØ,#colmax
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2280 :
1inelo EQUS STRING$(32,CHR$0)
2300 .lineli EQUS STRING$(32,CHR$0)
2310 :
2310 !
2320 |NEXT
2330 DIM mode2(7)
2340 FOR i=0 TO 7:READ mode2(i):NEXT
2350 cis="044115522663377"
2360 FOR c=1 TO 15
2370 colsp1(c=P%+O%)=mode2(VALMID$(ci$,c-1,1))
2380 colsp2(c=P%+O%)=mode2(VALMID$(ci$,c,1))
2390 NEXT
2400 FOR line=0 TO 31
2410 addr=13000+line*2280
2420 linelo7(line=P%+O%)=addr MOD 256
2430 lineli7(line=P%+O%)=addr DIV 256
2440 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2280 :
                                                                                                                                                                                                                                 Listing 2
                                                                                                                                                                                                                              10 REM >CloudSrc (Info2) (Machine code for Cloud8)
20 REM By Dave Lawrence
30 REM For 8 bit machines
40 REM (C) BAU Pebruary 1992
50:
60 PROCinit
70 PROCassemble
80 OSCLUTSave CCode "+STR$"code+" "+S
TR$"O%+" 900 900"
90 EMD
100:
110 DEF PROCinit
120 DIM code $200
          3710 MOVOT RØ, #colmax
3720 ]
3730 IF yy=0 THEN
3740 IF xx=0 THEN
3750 (OPT pass
3760 STRB RØ,[grid]
3770 ]
3780 ELSE
3790 (OPT pass
           3790 [OPT pass
3800 STRB RØ,[grid,xx]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1240 .nolsr
1250 AND #&0F
           3810 ]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1260 RTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1270 :
1280 .trans
           3820 ENDIF
                                                                                                                                                                                                                              100 :
110 DEF PROCINIT
120 DIM code £200
130 data=£2000
140 addr=£70
150 temp=£72
160 val=£73
170 read=£74
180 write=£76
190 addr2=£78
200 lines£7A
210 col=£7B
220 col=£7B
220 col=£7B
220 col=£7B
220 col=£7E
240 readrow=£7E
250 writerow=£7E
250 writerow=£7E
250 DEF PROCassemble
290 FOR pass=4 TO 6 STEP 2:P%=£900:O%=
code
300 [OPT pass
310 JMP poke
          3830 ELSE

3840 IF xx=0 THEN

3850 [OFT pass

3860 ADD Rl,grid,yy,ASL #8

3870 STRB R0,[Rl,yy,ASL #2]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1290 LDA #15
1300 STA line
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1395 STA line
1310. lineloop
1320 LDY line
1330 LDA linelo, Y
1340 STA read
1350 LDA linehi, Y
1360 STA read+1
1370 LDA line
1370 LDA line
1380 ASL A
1390 TAY
1400 LDA linehi, Y
1400 LDA linehi, Y
1410 STA addr-1
1440 LDA linehi, Y
1450 STA addr2
1440 LDA linehi, Y
1450 STA addr2-1
1440 LDA linehi+1, Y
1450 STA addr2-1
1460 LDA linehi+1, Y
1470 STA addr2-1
1480 LDA & 65
1490 STA col
1500 .colloop
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2440 NEXT
2450 ENDPROC
           3880 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2470 DATA 600,601,604,605,610,611,614,6
           389Ø ELSE
          3900 [OPT pass
3910 ADD R1,xx,yy,ASL #8
3920 ADD R1,R1,yy,ASL #2
3930 STRB R0,[grid,R1]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Listing 3
3930 STRb
3940 ]
3950 EMDIF
3950 EMDIF
3960 EMDIF
3990 DFF FNsetmfstep(stepreg)
4000 [OPT pass
4010 LDR R0, Scale
mf=(scale+1-loop)*dens
4020 ADD mf, R0, %1
4030 SUB mf, mf, loop
4040 LDR R1, Density
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              10 REM >Cloud8 (Info3) - 8 Bit cloud
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                plotter
20 REM By Dave Lawrence
30 REM Based on an idea by Andrew Jon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             40 REM For 8 bit machines
50 REM (C) BAU February 1992
60: 70 MODE 2:VDU 23;8202;0;0;0;
80 *FX10,0
90 *Load CCode
100 poke=£900:peck=£903;trans=£906
```

```
2476 DEF PROCUPEED
2480 FOR r=1 TO n
2490 FOR r=1 TO n
2490 FOR r=1 TO n
2490 FOR r=1 TO n
2500 n+=1
2510 e(n)=e(r)/2
2510 e(n)=e(r)/2
2510 e(n)=y(r)
2540 y(n)=y(r)
2550 y(n)=y(r)
2550 v(n)=e(r)/2
2570 m(n)=m(r)+1
2580 mt(n)=m(r)+1
2580 mt(n)=mt(r)
2590 f(n)=TO maxp*3
2610 p%(n,1%)=p%(r,1%)
2620 NEXT
2631 l(n)=l(r)
2640 e(n)=e(r)
2650 FRO Lego (-smt(r) THEN
2650 F
                 110 Weather=12
120 Density=0.5
130 Scale=6
140 PROCClouds (Weather, Density, Scale)
150 CALL trans
160 VDU 7
170 ITGET
180 END
190 :
                                                                                                                                                                                                                                                                                                                                                310 DIM p(max),c(max),m(max),s(max),mt
(max),1(max)
320 DIM p%(max,maxp*3)
330 x1=0
340 y1=0
350 fd=250
360 npocks)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ess any key to continue. ": g$=GET$: PROCc1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ear
1420 OTHERWISE
1430 PROCmark(1%-3)
1440 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                 360 PROChelp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1450 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                 370 PRINTTAB(25,22)"Load Bugworld?"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1460
                                                                                                                                                                                                                                                                                                                                                                 380 g%=GET AND &DF
390 CLS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1470 DEF PROCEOGI(a)
                                                                                                                                                                                                                                                                                                                                                           380 g%-GET AND &DF
390 CLS
390 CLS
400 IF g%-ASC"Y" THEN
410 mt()=50
420 PROCload
430 PROCOlear
440 ELSE
450 PRINTTAB(25,0)"BugWorld"
440 ELSE
450 PRINTTAB(25,0)"BugWorld"
460 FROCEC(t)
500 e(t)=100
510 d(t)=RND(4)
520 p(t)=1
530 c(t)=0
540 m(t)=0
550 s(t)=0
550 s(t)=0
550 m(t)=0
550 m(t)=0
550 m(t)=0
550 m(t)=0
550 m(t)=0
550 m(t)=50
570 NEXT
                       200 DEF PROCclouds (weather, density, sca
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1400 COL 1
1480 COL 1
1490 FOR f=1 TO a
1500 x=RND(112)+RND(112)-112:IF x<0 x+=
     le)
210 mf=(scale+1)*density
                 210 mf=(scale+1)*density
220 sqr=2'scale
230 PROCplot(0,0,weather)
240 PROCplot(0,0,weather)
250 PROCplot(0,sqr,0,weather)
250 PROCplot(0,sqr,sqr,weather)
270 FOR loop=0 TO scale-1
280 mf=(scale+1-loop)*density
290 step=2'(scale-loop)
300 FOR i=0 TO 2'loop-1
310 PROChav(i,i+1,0)
320 PROChav(i,i+1,0)
330 PROCvav(i,i+1,0)
340 PROCvav(i,i+1,0)
350 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1500 x=RND(112)+RND(112)-112:IF x<0 x=
224
1510 y=RND(110)+RND(110)-110:IF y<0 y=
220
1520 a*(x,y)=1
1530 POINT x*4,y*4
1540 REXT
1550 ENDPROC
1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2660 PROCmutate(n)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1560 :
1570 DEF PROCdraw(x,y,c)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2670 IF md=1 s(n)=7
2680 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1580 GCOL c
1590 LINE (x-1)*4,y*4,(x+1)*4,y*4
1600 LINE x*4,(y-1)*4,x*4,(y+1)*4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              269Ø ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2700 NEXT
2710 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1610 ENDPROC
                       350 NEXT
360 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2720 :
2730 DEF PROCENTINCT
2740 PRINTTAB(25,15) "That's all folks!"
2750 END
2750 ENDPROC
2770 :
2780 DEF PROCLOOP(r)
2790 IF c(r)=1 OR c(r)<0 THEN
2800 c(r)=0
2810 ELSE
2820 IF c(r)=0 THEN c(r)=t1 ELSE c(r)==
1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2720
               350 NEXT
360 NEXT
370 FOR loop=0 TO scale-1
380 mf=(scale+1-loop)*density
390 step=2^(scale-loop)
400 n=(2^loop-1)*step
400 n=(2^loop-1)*step
400 n=(2^loop-1)*step
400 FOR j=0 TO n STEP step
420 FOR j=0 TO n STEP step
440 PAETNPENEK(i,j+step)
450 pa=FNpeek(i+step,j)
460 PAETNPENEK(i+step,j+step)
470 Ab=INTY((pl+p2+p3+p4)/4+mf*(RND(1)*-1+0.5)
480 NEXT
500 NEXT
500 NEXT
510 FI loop<0 PROCfillin
520 NEXT
530 ENDPROC
540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1630 DEF PROCmove(r)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1630 DEF PROCESORY (1)
1640 C=RMD(169)
1650 IF c>t1 AND c<t2 THEN
1660 PROCD(TAW (r), y(r), 0)
1690 0 (x(r), y(r), 0)
1690 0 (x) (y(r), 0)
1690 WEEN 1:x(r) +=1:IF x(r) > 223 x(r) = 22
3:d(r) = 3
1700 WHEN 2:y(r) +=1:IF y(r) > 219 y(r) = 21
9:d(r) = 4
1710 WHEN 3:x(r) -=1:IF x(r) < 1 x(r) = 1:d(r) = 1
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 1
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 1:d(r) = 2
1720 WHEN 4:y(r) -=1:IF y(r) < 1 y(r) = 2
1720 WHEN 4:y(r) -=
                                                                                                                                                                                                                                                                                                                                                               570 NEXT
                                                                                                                                                                                                                                                                                                                                                               580 e(4)=150
590 s(4)=6
                                                                                                                                                                                                                                                                                                                                                           580 e(4)=150
590 e(4)=6
600 RESTORE 6090
610 PROCREC (4)
620 mt(4)=1
630 e(5)=150
640 e(5)=3
650 RESTORE 6120
660 PROCREC (5)
670 mt(5)=1
680 GCOL 1
690 FOR r=1 TO max
700 x(r)=RND(214)+5
710 y(r)=RND(210)+5
720 w(xr)=RND(210)+5
740 PROCFCOG(12000)
7450 EXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2830 IF t2<=1(r)-2 p(r)=t2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2840 ENDIF
2850 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          r)=2
1730 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2860 :
2870 DEF PROCsee(r)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1730 ENDCASE

1740 a%(x(r),y(r))=2

1750 e(r)-=10

1760 PROCmunch(x(r)+1,y(r))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          28% CASE d(r) OF

28% CASE d(r) OF

28% WHEN 1:PROClook(x(r)+1,x(r)+10,y(r)-1,y(r)+1)

29% WHEN 2:PROClook(x(r)-1,x(r)+1,y(r)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1700 PROCMunch(x(r)-1,y(r))
1780 PROCmunch(x(r)-1,y(r)+1)
1780 PROCmunch(x(r)-y(r)-1)
1800 IF e(r)>2000 THEN e(r)=2000:breed=
                       540 :
                                                                                                                                                                                                                                                                                                                                                                 750 ENDIF
                                                                                                                                                                                                                                                                                                                                                               750 ENDIF
760 PROCselectbug(1)
770 ENDPROC
550 DEF PROCfillin
560 add=-1
570 step=step/2
580 FOR i=step TO (2^(loop+1)-1)*step
570 step = 590 FOR j=(1-add)*step TO (2^(loop+1)+
600 p1=FNpeek(i-step,j)
610 p2=FNpeek(i-step,j)
620 p1=FNpeek(i,j-step)
630 p1=FNpeek(i,j-step)
630 p1=FNpeek(i,j-step)
640 Ab=INT((p1+p2+p3+p4)/4+mf*(RND(1)*
2-1)+0.5)
650 Xx=irY=j:CALL poke
660 NEXT
670 add=NOT add
680 NEXT
                       550 DEF PROCESILLIA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2990 WHEN 2:PROCIOOK(x(r)-1,x(r)+1,y(r)+1,y(r)+1,y(r)+10)
2910 WHEN 3:PROCIOOK(x(r)-10,x(r)-1,y(r)+1,y(r)+1)
2920 WHEN 4:PROCIOOK(x(r)-1,x(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+1,y(r)+
                                                                                                                                                                                                                                                                                                                                                           770 ENDPROC
780:
790 DEF PROCselectbug(s)
800 IF sel<>8 THEN
810 sel=s
820 PROCgene(s)
830 PROCdata(TRUE)
840 waspr=1
850 ENDFROC
870:
870:
880 DEF PROChelp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1800 IF e(r)>2000 THEN e(r)=2000:breed:
TRUE
1810 ELSE
1820 IF cc1 THEN d(r)-=1 ELSE d(r)+=1
1830 IF d(r)<1 THEN d(r)=4
1840 IF d(r)<4 THEN d(r)=1
1850 e(r)-=2
1860 ENDIF
1870 ENDPROC
1880 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2970 FOR sy=y0 TO y1
2980 FOR sx=x0 TO x1
2990 IF sx=223 AND sx>=1 AND sy<=219 A
ND sy>=1 THEN
3000 IF a*(sx,sy)=t1 THEN p(r)=t2:sx=x1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1880 :
1890 DEF PROCdead(r)
                                                                                                                                                                                                                                                                                                                                                               870 :
880 DEF PROChelp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1900 dead=TRUE
                                                                                                                                                                                                                                                                                                                                                             890 CLS
900 PRINTTAB(25,5) "OPERATIONAL COMMAND
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1910 e(r)=-1
1920 IF r=sel PROCselectbug(-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        :sy=y1
3010 ENDIF
                                                                                                                                                                                                                                                                                                                                          900 PRINTTAB(25,5) "OPERATIONAL COMMAND
S"
910 PRINTTAB(16,8)"2-7 - Colour curren
tly selected species"
920 PRINTTAB(18,10)"D - Highlighting m
ode toggle"
930 PRINTTAB(18,14)"H - List operation
al commands (this page)"
950 PRINTTAB(18,16)"T - Trace numbered
bug (or use mouse)"
960 ENDPROC
970:
980 DEF PROCMAIN
990 dead=PALSE
1000 breed=PALSE
1010 FOR r=1 To n
1020 t=p%(r,p(r))
1030 ti=p%(r,p(r)+1)
1040 ti=p%(r,p(r)+1)
1040 ti=p%(r,p(r)+2)
1050 p(r)+=3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1930 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3020 NEXT
3030 NEXT
3040 ENDPROC
                       680 NEXT
690 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1940 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1950 DEF PROCmunch(x,y)
                   698 ENDROC
700 :
710 DEP PROChav(a,b,y)
710 D1=FNpeek(a*step,y)
710 D1=FNpeek(b*step,y)
710 P1=FNpeek(b*step,y)
710 P1=FNpeek(b*step,y)
710 DEP PROCylot((a+b)*step/2,y,(p1+p2)/2)
710 DEP PROCvav(a,b,x)
710 DEP PROCvav(a,b,x)
710 DEP PROCylot(x,a*step)
710 P1=FNpeek(x,a*step)
710 P1=FNpeek(x,b*step)
710 P1=FNpeek(x,b*step)
711 P1=FNpeek(x,b*step)
712 P1=FNpeek(x,b*step)
713 P1=FNpeek(x,b*step)
714 P1=FNpeek(x,b*step)
715 P1=FNpeek(x,b*step)
716 P1=FNpeek(x,b*step)
717 P1=FNpeek(x,b*step)
718 P1=FNpeek(x,b*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1950 DEF PROCHUNCH(x,y)
1960 CASE a%(x,y) OF
1970 WHEN 1:
1980 e(r)+=fd
1990 a%(x,y)=0
2000 WHEN 2:
2010 FOR v=1 TO n
2020 IF v<>r THEN
2030 IF (x(y)>=x(r)-1 AND x(y)<=x(r)+1)
AND (y(y)>=y(r)-1 AND y(y)<=y(r)+1) THE
N a%(x,y)=0:e(r)+=e(y):PROCdead(y)
2040 ENDIF
2050 NEXT
2060 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    3050 :
3050 DEF PROCMULATE(r)
3070 IF 1(r)=3 THEN rm=RND(2) ELSE rm=R
ND(7)
3080 CASE rm OF
3090 WHEN 1:PROCADITION(r)
3110 WHEN 3:PROCaddition(r)
3110 WHEN 3:PROCadditraction(r)
3120 WHEN 4:PROCabtraction(r)
3130 WHEN 5:PROCabwap(r)
3140 WHEN 7:PROCaddutler(r)
3150 WHEN 7:PROCadouble(r)
3150 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2060 ENDCASE
                     830 DEF FNpeek(X%,Y%)
840 =USR(peek)AND&FF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2070 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3160 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  2080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            317Ø ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2000 DEF PROCCOMPACT
2100 DEF PROCEXTINCT
2110 p=1
2110 p=1
2110 P=1
2120 WHILE p<=n
2130 IF e(p)<0 THEN
2140 PROCGTAW(x(p),y(p),0)
2150 PGR i%=1 TO l(n)
2150 PGR i%=1 TO l(n)
2160 p%(p,i%)=p%(n,i%)
2170 NEXT
2180 l(p)=l(n)
2200 d(p)=d(n)
2210 x(p)=x(n)
2210 y(p)=y(n)
2210 y(p)=p(n)
2210 y(p)=p(n)
2210 c(p)=p(n)
2210 y(p)=p(n)
2210 c(p)=p(n)
2210 c(p)=m(n)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2090 DEF PROCcompact
                                                                                                                                                                                                                                                                                                                                                   1040 t2=p%(r,p(r)+2)
1050 p(r)+=3
1060 IF p(r)>1(r) THEN p(r)=1
1070 CASE t OF
1080 WHEN g_move:
1090 PROCMOVe(r)
1100 WHEN g_jump:
1110 p(r)=t2
1120 e(r)-=1
1130 WHEN g_loop:
1140 PROCloop(r)
1150 e(r)-=1
1150 WHEN g_see:
1170 PROCsee(r)
1180 e(r)-=2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3180
                   850 DEF PROCPLOT (X%, Y%, c)
870 A%=INT (c+mf*(RND(1)*2-1)+0.5)
880 CALL poke
890 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3180 :
3190 DEF PROCtrace
3200 PRINTTAB(0,0) "Which bug? (1-";n;")
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ";
3210 INPUT""r
3220 IF r>=1 AND r<=n PROCselectbug(r)
3230 PRINTAB(0,0)SPC25
3240 EMDPROC
3250 :
3260 DEF PROCclear
3270 CLS
3280 GCOL 1
3290 PRINTAB(25,0) "BugWorld"
3290 PRINTAB(25,0) "BugWorld"
     Listing 4
                       10 REM > Bugworld (Info4)
20 REM by I Reeve
30 REM for 32-bit machines
40 REM (c) BAU February 1992
50:
60 PROCinit
70 REPEAT
80 PROCMain
90 UNTL FALSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3300 FOR x=1 TO 224
3310 FOR y=1 TO 220
3320 IF a%(x,y)=1 POINT x*4,y*4
3330 NEXT
                                                                                                                                                                                                                                                                                                                                                     1180 e(r) -= 2
1190 wHEN g_hungry:
1200 IF e(r) <t1*10 THEN p(r) =t2
1210 e(r) -= 2
1220 ENDCASE
                     90 UNTIL FALSE
100 END
110 :
120 DEF PROCINIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2250 m(p)=m(n)
2260 s(p)=s(n)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            334Ø NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2260 S(p)=S(n)
2270 mt(p)=mt(n)
2280 IF sel=n sel=p
2290 n-=1
2300 ELSE
2310 p+=1
2320 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3340 PROT r=1 TO n
3350 PRO r=1 TO n
3360 PROCdraw(x(r),y(r),s(r))
3370 a%(x(r),y(r))=2
3380 s(r)=7
3390 NEXT
3400 ENDPROC
3410 :
110 :
120 DEF PROCINIT
130 MODE 12
140 OFF
150 *FX 9,10
160 *FX 10,10
170 *POINTER 1
180 CLS
190 sel=-1
200 waspr=1
210 g_move=201
220 g_jimmp=202
230 g_loop=203
240 g_see=204
250 g_hungry=205
260 max=200
270 nrst=1
280 md=1
290 maxp=25
300 DIM a%(224,220),c%(28,220),e(max),d(max),x(max),y(max)
                                                                                                                                                                                                                                                                                                                                                1230 IF e(r)<0 PROCdead(r)
1240 IF r=sel PROCdraw(x(r),y(r),8) ELS
E PROCdraw(x(r),y(r),s(r))
1250 NPT
                                                                                                                                                                                                                                                                                                                                                       1250 NEXT
                                                                                                                                                                                                                                                                                                                                                     1250 NEXT
1260 IF dead PROCcompact
1270 IF breed PROCbreed
1280 PROCcommand
1290 PROCfood(1)
1300 PROCdata(dead OR breed)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3390 MBAT
3400 ENDPROC
3410:
3420 DEF PROCrate(r)
3430 mt(r)=RRD(11)=6
3440 IF mt(r)<1 mt(r)=1
3450 IF mt(r)>100 mt(r)=100
3460 ENDPROC
3470:
3480 DEF PROCAddition(r)
3490 LOCAL 1
3500 l=1(r) DIV 3
3510 IF 1>=maxp ENDPROC
3520 pl=FNrg(r)
3530 new0=200+RND(5)
3540 CASE new0 OF
3550 WHEN g_move:new1=RND(30)
3560 WHEN g_jump:new1=RND(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2330 ENDWHILE
2340 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2350 : 2360 DEF PROCSWitch
2360 DEF PROCSWitch
2380 md=2
2390 PRINTTAB(0,2)"All descendants high
lighted."SPC16
2400 ELSE
2410 md=1
2420 PRINTTAB(0,2)"Only non-mutated des
cendants highlighted."
2430 s()=7
2440 ENDIF
2445 ENDPROC
2460 :
                                                                                                                                                                                                                                                                                                                                                     1300 PROCCata (dead of
1310 PROCmouse
1320 ENDPROC
1330 :
1340 DEF PROCcommand
                                                                                                                                                                                                                                                                                                                                              1346 DEF PROCCOMMAND
1356 %=NISTR(" TUSEDDHH203#4$5%6"7%",I
NKEY$(0)) DIV 2
1360 CASE 1% OF
1370 WHEN 0:
1380 WHEN 1:PROCTACE
1390 WHEN 1:PROCSAVE
1400 WHEN 3:PROCSAVE
```

```
3576 WHEN g_loop:new1=RND(20)
3580 WHEN g_see:new1=RND(2)
3590 WHEN g_see:new1=RND(99)
3600 ENDCASE
3610 IF new0=g_move THEN
3620 new2=RND(99)
3630 ELSE
3640 new2=RND(1(r)/3+1)*3-2
3650 ENDIF
3660 FOR i%=1(r) TO pl STEP -1
3670 p%(r,i%+3)=p%(r,i%)
3680 NEXT
3690 p%(r,pl)=new0
3700 p%(r,pl+1)=new1
3710 p%(r,pl+2)=new2
3720 1(r)+=3
3730 ENDPROC
3740 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 720 IF INKEY-98 PROCECTO11(0,100p%,0,1
                                                                                                                                                                                                                                                               4700 ENDIF
4710 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   5810 DEF PROCexpand
5820 PRINTTAB(0,0) "Expanding. Please wa
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       oop%-1)
730 IF INKEY-67 PROCECTOLL(1,loop%,80-
                                                                                                                                                                                                                                                              4710 ENDPROC
4720 : 4730 DEF PROCMARK(col)
4740 FOR bug=1 TO n
4750 IF s(bug)=col THEN s(bug)=7
4760 IF FNsame(bug) THEN s(bug)=col
4770 NEXT
4780 ENDPROC
4790 :
4800 DEF FNsame(r)
4810 IF sel=-1 THEN =PALSE
4820 IF I(r)<1(sel) THEN =FALSE
4830 i%=0
4840 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       loop%,79)
740 UNTIL FALSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                it."
5830 FOR y=1 TO 220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   5830 FOR y=1 TO 220
5840 x=1
5850 FOR cx=1 TO 28
5860 EN=ck(cx,y)
5870 FOR ex=1 TO 8
5880 IF (t% AMD 120)=128 a%(x,y)=1
5890 t%=tk<<1
5990 x=1
5910 NEXT
5920 NEXT
5930 NEXT
5930 NEXT
5930 REXT
5930 REXT
5950 EMDEROC
5960 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 750 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    760:
778 DEP PROCSCTOll(dirk,loopk,x0k,x1k)
788 RECTANGLE FILL 0,0,1279,1023 TO -1
6*loopk*(dirk*2-1),0
799 Ob=(dirk*2-1)*loopk
800 FOR xk=x0k TO x1k
810 YDU 28,xk,31,xk,1,12
820 IF xk+ok=0 AND xk+ok<x0k(0) PRINTC
$(xk=x0k)
830 YDU 26
840 NEXT
850 ENDPROC
850:
                                                                                                                                                                                                                                                                  4850 i%+=1
4860 UNTIL i%=1(r) OR p%(r,i%)<>p%(sel,
             3740 :
3750 DEF PROCsubtraction(r)
                                                                                                                                                                                                                                                            i%)
4870 =p%(r,i%)=p%(sel,i%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      5960 :
5970 DEF PROCset(r)
  3755 DEF PROCSUBTRACTION(r)
3756 LOCAL p1
3766 LOCAL p1
3768 IF pl-1(r)-2 THEN
3768 OF sk-p1 TO 1(r)-3
3860 p%(r,i%)=p%(r,i%+3)
3810 NEXT
3820 ENDIF
3830 1(r)-3
3840 ENDPROC
3850:
3860 DEF PROG(r)
3870 IF 1(r)=3 THEN =1 ELSE =RND(1(r) D
IV 3)*3-2
3880:
3890 DEF PROCSWAP(r)
3900 LOCAL p1,m%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 860 :
870 DEF FNbranch(f$,leaf$,y%)
880 LOCAL i%,1%
890 1%=n%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      5980 1(r)=0
5990 REPEAT
                                                                                                                                                                                                                                                                4890 DEF PROCmouse
                                                                                                                                                                                                                                                               4890 DEF PROCMOUSE
4900 MOUSE mx,my,mb
4910 IF mb>0 THEN
4920 nrst=-1
4930 clst=100
4940 FOR bug=1 TO n
4950 dist=SQR((x(bug)*4-mx)^2+(y(bug)*4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      6000 READ 1%
6010 IF 1%>-1 1(r)+=1:p%(r,1(r))=i%
6020 UNTIL 1%=-1
6030 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          See 1%-1%

500 1%-1%

500 1%-19

510 18(1%)=Leaf$

520 1%(1%)=Len(Leaf$)

520 1%(1%)=Len(Leaf$)

530 y%(1%)=y%

540 87S "XOS F116",5,f$ TO type%

550 1%-0

570 REPEAT

580 87S "XOS_GBPB",9,f$,q%,1,1%,£100,"

"" TO ,, r%,1%

590 1F r%,0 THEN

1000 PRINTSFC12;CRS13;

1010 87S "05. Write0",q% TO 1%

1020 1%7-1-13

1030 %(1%)+=FNbranch(f$+"."+$q%,$q%,y%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   6030 EMDPROC

6040:

6050 REM Simple bug:

6060 DATA g_move,10,90,-1

6070

6080 REM "Tummyrumble":

6090 DATA g_move,15,85,g_hungry,50,10,9

1jump,99,1,g_move,2,98,g_hungry,50,10,-1

6100
                                                                                                                                                                                                                                                               my) 2)
4960 IF dist<clst THEN clst=dist:nrst=b
                                                                                                                                                                                                                                                         ug
4970 NEXT
4980 PROCselectbug(nrst)
4990 ENDIF
5000 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               6100
6110 REM "Visionary":
6120 DATA g_move, 90, 95, g_see, 1, 10, g_jum
p, 99, 1, g_move, 5, 95, g_loop, 10, 10, -1
    3890 DEF PROCSWAP(r)
3900 LOCAL, pl.m5
3910 IF 1(r)<6 ENDPROC
3920 IF 1(r)<6 ENDPROC
3920 IF 1(r)=6 pl=1 ELSE pl=RND((1(r) D
IV 3)-1)*3-2
3930 FOR i%=pl TO pl+2
3940 SHAP p%(r,i%),p%(r,i%+3)
3950 NEXT
3960 ENDPROC
3970
                                                                                                                                                                                                                                                         5808 ENDPROC
5010:
5020 DEF PROCCATA(recount)
5030 PRINTTAB(0,0) "Population=";n;" "
5040 IF sel>-1 THEN
5050 PRINTTAB(52,0) "Bug no. ";sel;" Ge
neration ";m(sel);" "
5060 PRINTTAB(56,1) "Energy level ";INT(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Listing 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1040 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1040 EMDLF
1050 UNTIL 1%=-1
1060 EMDLF
1070 IF v%(1%) < LEN(leaf$) +2 v%(1%) = LEN(
leaf$) +2
1080 = w%(1%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               10 REM >ScrlTree32 (Info5)
20 REM Scrolling directory tree
30 REM by Dave Acton
40 REM for 32-bit machines
50 REM (c) BAU February 1992
60:
70 MODE 0
80 VDU 23,224,24,24,24,24,24,24,24,25
                                                                                                                                                                                                                                                         S060 PRINTTAB(56,1)"Energy level ";INT(e(sel));""
5070 PRINTTAB(71,4+waspr/3)SPC6TAB(71,4+p(sel)/3)"<";
5080 IF c(sel)>0 PRINT;c(sel)
5090 waspr=p(sel)
5100 IF recount THEN
5110 no-0
5120 FOR bug=1 TO n
5130 IF FNsame(bug) no+=1
5140 NEXT
5150 PRINTTAB(56,2)SPC10
5160 PRINTTAB(56,2);no;" similar"
5170 ENDIF
           3970 :
3980 DEP PROCalter(r)
3990 LOCAL 1
4000 l=1(r) DIV 3
4000 l=1(r) DIV 3
4010 pl=RND(l)
4020 CASE RND(3) OF
4030 WHEN 1:
4040 al=200+RND(5)
4050 p%(r,(pl=1)*3+1)=al
4060 PROCadjust
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Listing 6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       10 REM >SCRITTEE8 (Info6)
20 REM Scrolling directory tree
30 REM by Dave Acton
40 REM for M/C (ADFS only)
50 REM (c) BAU February 1992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4860 PROCAdjust
4070 WHEN 2:
4070 WHEN 2:
4080 al=p%(r,(pl-1)*3+2)+RND(11)-6
4090 PROCCheck
4100 p%(r,(pl-1)*3+2)=al
4110 WHEN 3:
4120 PROCAdjust
4130 ENDCASE
4140 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        70 MODE 128
80 VDU 23,224,24,24,24,24,24,24,24,25
                                                                                                                                                                                                                                                                  517Ø ENDIF
                                                                                                                                                                                                                                                                  5180 ENDIF
5190 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    50 VDU 23,225,24,24,24,24,24,24,24,24,24,24
100 VDU 23,225,0,0,0,0,0,0,0,31
110 VDU 23,227,0,0,0,0,0,0,0,0,255
120 VDU 23,229,24,24,24,24,24,24,24,0
140 max=150
150 maxd=10
160 DIM b% 20,0% £100,n$(max),x%(max),y%(max),1%(max)
170 DIM f%(max),w%(max)
180 X%=b% MOU 256
190 Y%=b% DIV 256
200 REPEAT
210 INPUTWhich directory? "root$
220 Ib%=0%
                                                                                                                                                                                                                                                               5190 ENDFROCT
5200 :
5210 DEF PROCSAVE
5220 PEINTTAB(0,0) "SAVE BUGWORLD?"
5230 g$-GET$
5240 PEINTTAB(0,0) SPC19
5250 IF g$="Y" OR g$="y" THEN
5260 PROCSQUEEZE
5270 $-00PENOUT"BUGG"
5280 FOR x=1 TO 28
5290 FOR y=1 TO 220
5300 BPUT#f,c%(x,y)
5310 NEXT
5320 NEXT
5330 BPUT#f,n
5330 BPUT#f,n
     1410 ENDPROC
4150:
4160 DEF PROCCheck
4170 IF alc1 al=1
4180 IF alc9 al=99
4190 ENDPROC
4200:
4210 DEF PROCAdjust
4220 IF p%(r, (pl-1)*3+1)=g_move THEN
4220 If p%(r, pl*3)+RND(11)-6
4240 PROCCheck
4250 p%(r, pl*3)=al
4260 ELSE
4270 IF p%(r, (pl-1)*3+1)=g_see THEN p%(
r, (pl-1)*3+2)=RND(2)
4280 al=(RND(1)-1)*3+1
4300 ENDIF
4300 ENDIF
4310 ENDPROC
4320:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  190 Ya=bb DIV 256
200 RFPRT
210 IMPUT*Which directory? "root$
220 lba-qh
230 $q%=root$
240 Ah=5
250 UNTIL FNtype(root$)=2
250 UNTIL FNtype(root$, 2)
250 UNTIL FNtype(root$, 2)
250 UNTIL FNtype(root$, 2)
250 dynamy=FNbranch(root$, root$, 0)
290 fx(0)=x%(0) DIV 2
300 xx(0)=fx(0)
310 lx=0
320 wx(0)=fx(0)
330 deepestx=0
340 FOR ix=1 To nk-1
350 IF yk(ix)-lk THEN fk(yk(ix))=fx(lk)
-wx(1k) DIV 2 +wx(ix) DIV 2 ELSE fk(yk
(ix))=fx(yk(ix))-wxk(yk(ix)) DIV 2 +wxk(yk(ix))
350 lx(ix)=fx(yk(ix))-lk(ix) DIV 2 +wxk(yk(ix))
360 xx(ix)=fx(yk(ix))-lk(ix) DIV 2 +1
370 lk=yk(ix)
390 IF lk=deepestk=1
340 DNXT
400 MXXT
410 msk=3*deepestk=3
420 DIN Ch smk*wk(0)
430 FOR ix=0 TO wk(0)-1
440 f(ck+smk*ix)=STRING$(msk-1, ")
450 NXT
460 FOR ix=0 TO wk(0)-1
470 FOR xx=1 TO lk(ix)
480 ck?(msk*(xk+xk)(ix)-1)+yk(ix)*3+1)=
ASCMIDS(nk(ix), xk.)1
490 NXXT
500 IF ikcnk-1 PROChotlast
510 IF iksnk-1 PROChotlast
                                                                                                                                                                                                                                                                  5340 FOR r=1 TO n
5350 BPUT#f,l(r)
5360 FOR i%=1 TO l(r)
5370 BPUT#f,p%(r,i%)
                                                                                                                                                                                                                                                           5370 BUT#f.p%(r,1%)
5380 NEXT
5390 PRINT#f,e(r),d(r),x(r),y(r),p(r),c
(r),m(r),mt(r)
5400 NEXT
5400 NEXT
5410 CLOSS#f
5410 ENDIF
5410 ENDIF
5410 ENDPROC
5440:
5450 DEF PROCload
5460 f=0PENIN*Buge"
5470 FOR x=1 TO 28
5480 FOR y=1 TO 220
5490 c%(x,y)=BGET#f
5500 NEXT
5510 NEXT
           4316 ENDPROC
4320:
4330 DEF PROCdouble(r)
4340 LOCAL pl
4350 IF I(r)>=3*maxp ENDPROC
4350 pl=PNrg(r)
4370 FOR i*s=1(r)+3 TO pl+3 STEP -1
4380 p%(r,i%)=p%(r,i%-3)
4390 NEXT
4400 I(r)+=3
4410 ENDPROC
4420:
4400 1(r)+3
4410 ENDPROC
4420:
4430 DEF PROCGENE(g)
4440 IF gymax-1 ENDPROC
4450 FOR gn=1 TO 27
4460 PRINTTAB(56,gn+3)SPC19
4470 NEXT gn
4480 IF g=-1 THEN
4490 PRINTTAB(52,0)SPC28TAB(40,1)SPC40T
AB(56,2)SPC24
4500 ELSE
4510 PRINTTAB(40,1)"Mutation rate":PRIN
TTAB(44,2):mt(g);" "
4520 gn=1
4530 REPERT
4540 PRINTTAB(58,gn+3); (gn-1)*3+1
4550 t=p%(g, (gn-1)*3+1)
4550 t=p%(g, (gn-1)*3+1)
4550 t=p%(g, (gn-1)*3+1)
4550 t=p%(g, (gn-1)*3+1)
4560 t=p%(g, (gn-1)*3+1)
4560 t=p%(g, (gn-1)*3+1)
4570 t2=p%(g, gn+3)
4580 PRINTTAB(61,gn+3)"";
4590 CASE t OF
4600 WHEN g_ move:COLOUR 1:PRINT"M "
4610 WHEN g_ jump:COLOUR 2:PRINT"L "
4630 WHEN g_ jump:COLOUR 3:PRINT"L "
4630 WHEN g_ see:COLOUR 6:PRINT"L "
4640 WHEN g_ see:COLOUR 6:PRINT"S "
4640 WHEN g_ see:COLOUR 6:PRINT"S "
4640 WHEN g_ see:COLOUR 5:PRINT"H "
                                                                                                                                                                                                                                                         3470 C%(X,Y)=SGGT#E

5500 NEXT

5510 NEXT

5520 n=SGGT#E

5530 FOR r=1 TO n

5540 1(r)=HGGT#E

5550 FOR i%=1 TO 1(r)

5560 p%(r,i%)=HGGT#E

5570 NEXT

5580 INPUT#E,e(r),d(r),x(r),y(r),p(r),c

(r),m(r),mt(r)

5590 NEXT

5600 CLOSE#E

5610 PROCexpand

5620 ENDPROC

5630 :

5640 DEP PROCexpand

5650 PRINTTAB(0,0)"Squeezing. Please wa

it."
                                                                                                                                                                                                                                                                5560 x=1
5560 t=0
5560 t=0
5560 t=0
5700 FOR ex=1 TO 28
5700 FOR ex=1 TO 8
5710 t=t=t<<1
5720 IF a%(x,y)=1 THEN t%+=1
5730 X+=1
5740 NEXT
5740 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                640 ENDIF

650 ENDIF

660 IF 1%>0 MID$(c$(x*(1%)+1*(1%) DIV

2),y*(1%)*3,1)=CHR$229

670 NEXT

680 0%***(0) DIV 2-120+1*(0) DIV 2

690 PROCscroll(1,80,0,73)

700 REPEAT

710 loop%=1-4*INKEY-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       cop%-1)
580 IF INKEY-67 PROCSCroll(1,loop%,80-
              4650 ENDCASE
4660 PRINTTAB(65,gn+3);t1;TAB(69,gn+3);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        100p%,79)
590 UNTIL FALSE
                                                                                                                                                                                                                                                                  5750 C%(Cx,y)=t%
5760 NEXT
5770 NEXT
5780 PRINTTAB(0,0)SPC23
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  600 END
              4670 COLOUR 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     610
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  620 DEF PROCnotlast
630 IF y%(i%+1)<=y%(i%) ENDPROC
              4680 gn+=1
4690 UNTIL gn*3>1(g)
                                                                                                                                                                                                                                                                  5790 ENDPROC
```

```
640 x0%=x%(i%+1)+1%(i%+1) DIV 2
650 j%=i%+1
660 REPEAT
670 IF y(j%)=y%(i%+1) x1%=x%(j%)+1%(j
%) DIV 2
680 j%=j%+1
690 UNTIL y%(j%)<=y%(i%) OR j%=i%
700 IF x1%=x0% THEN c%?(ss%*(x%(i%)+1%
(i%) DIV 2)+y%(i%)*3x2)=225:RDPROC
710 FOR x8=x0%+1 TO x1%-1
720 c%?(ss%*x%xy%(i%)*3+2)=227
730 NEXT
740 c%?(ss%*x%xy%(i%)*3+2)=226
750 c%?(ss%*x1%+y%(i%)*3+2)=228
760 c%?(ss%*x1%+y%(i%)*3+2)=228
760 c%?(ss%*x1%+y%(i%)*3+2)=228
760 c%?(ss%*x1%+y%(i%)*DIV 2)+y%(i%)*3+2)=24
                                                                                                                                                                                           60 MODE 2
70 VDU 23,1,0;0;0;0;
80 VDU 19,15,7,0,0,0
90 VDU 23,224,170,85,170,85,170,85,17
                                                                                                                                                                                                                                                                                                                                                                    810 PRINT TAB(n+1,(n*3)+1);"+"
820 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RØ, [wp, R2]
R2, R2, #1
RØ, #Ø
                                                                                                                                                                                                                                                                                                                                                                    820 ENDPROC
830 :
840 DEF PROCloop
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   340 ADD
350 CMP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   360 BNE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                copyname
R2,#%11
                                                                                                                                                                              9.85

100 PRINT TAB(0,23);"3 Band"

110 bands=3

120 PROCresistor(bands)

130 a$=CHR$(224)
                                                                                                                                                                                                                                                                                                                                                                    850 PROCcursor
860 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                R2, R2, #%11
R2, R2, #4
R2, [wp, #0]
R0, #200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  390 ADDNE
400 STR
410 MOV
                                                                                                                                                                                                                                                                                                                                                                     870 PROCkeys
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RO,#200

RI,TASK

R2,name

"XWimp_Initialise"

(sp)!, (R6)

R0,#17

R1,wp

R2,#3

"XWimp_SendMessage"

(sp)!, (R6)

"XWimp_CloseDown"

(sp)!, (R0-R2,pc)
                                                                                                                                                                                                                                                                                                                                                                    89Ø ENDPROC
                                                                                                                                                                                                                                                                                                                                                           900:
910 DEF PROCSelect
920 IF m=0 PRINT TAB(0,26); STRING$(LEN b$,""):b$="":FRINT TAB(2,29); STRING$(b ands,""):TAB(2,30); STRING$(bands,"")
930 m=m+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 410 MOV
420 LDR
430 ADR
440 SWI
450 STMFD
460 MOV
470 MOV
480 MOV
490 SWI
500 LDMFD
510 SWI
520 LDMFD
530 :
                                                                                                                                                                              170 bS="
180 DIM c(9,2),c$(9)
190 FOR f=0 TO 9
200 READ c(f,1),c(f,2)
210 NEXT
220 FOR f=0 TO 9
210 REAT
250 FOR f=0 TO 9
260 FOR g=(f*3) TO (f*3)+3
270 PROCCO1(f)
280 PRINT TAB(f,9);a$;a$;a$
290 IF g=(f*3)+1 COLOUR 128:COLOUR 7:P
RINT TAB(f+4,g),c$(f)
300 NEXT
  %)*3+2)=224
77Ø ENDPROC
78Ø :
                                                                                                                                                                                                                                                                                                                                                                    950 PRINT TAB(1+m,29);a$;TAB(1+m,30);a
  788 : 780 DEF PROCSCIOLI (dir*, loop*, x0*, x1*)
800 FOR x*=1 TO loop*
810 VDU 23,7,1,dir*,1|
820 NET*
830 0%=0%+(dir**2-1)*loop*
840 FOR **x0%* TO x1%
850 IF X*+0%>=0 AND X*+0%</br>
850 IF X*+0%>=0 AND X*+0%</br>
850 IF X*+0%>=0 AND X*+0%</br>
860 NET*
870 ENDPROC 880 :
                                                                                                                                                                                                                                                                                                                                                                960 COLOUR 128

970 COLOUR 7

980 IF mcbands b$-b$+STR$(n)

990 IF mcbands PROCZeros:m=0

1000 PRINT TAB(0,26);b$

1010 REPEAT UNTIL (INKEY(-99) OR INKEY(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  530 :
540 .TASK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EQUS "TASK"
EQUS "To Edit"+CHR$0
"By Dave Lawrence 30 Oct 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  550 .name
560 EQUS
                                                                                                                                                                                                                                                                                                                                                                 74))=0
1020 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               "570 | NEXT
580 SYS "OS_File", 10, "SendToEdit", &FFC
, code, P%
                                                                                                                                                                                                                                                                                                                                                                1030 :
1040 DEF PROCzeros
1050 c$="R "
                                                                                                                                                                                       300 NEXT
310 PROCbox(f*64,1023-(g-4)*32)
                                                                                                                                                                                                                                                                                                                                                         1040 DEF PROCZEROS
1050 c5="R"
1060 p=0
1070 IF RIGHT$(b$,2)="00" AND ((n+2) DI
V 3)>0 AND bands=4 p=2:b$=LEFT$(b$,bands
-3):VDU 7
1080 IF RIGHT$(b$,1)="0" AND ((n+1) DIV
3)>0 p=1:b$=LEFT$(b$,bands=2)
1090 IF (n+p)>2 c5="K"
1100 IF (n+p)>5 c$="K"
1110 IF (n+p)>5 c$="M"
1110 IF (n+p)>8 c$="000M"
1120 b$=b$+$STRING$((n+p) MOD 3,"0")+c$
1130 DEF PROCdelete
1160 PRINT TAB(0,26);STRING$(LEN b$,""
);TAB(2,29);STRING$(bands,"");TAB(2,30)
;STRING$(bands,"")
1170 b$=""
1180 m=0
1190 EMDPROC
1200:
                                                                                                                                                                                        320 NEXT
           880 :
890 DEF FNbranch(f$,leaf$,y%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 9
                                                                                                                                                                                        330 PROCloop
340 END
           900 LOCAL 1%, r%
910 PRINTCHR$13; f$; SPC40;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        10 REM >1LineStars (Info9) By Robert
Bergs (C) BAU Februrary 1992
20 MODE2:VDU 23;8202;8;8;9;c=6:FORY=
#07506:Y=Y-9;RN(20):FORX=#07506STEP9+RN
D(9):C=C-1:GCOL8;C:IFC>14C=8:FLOT69,X,Y:
NEXT,:ELSFLOTGS,X,Y:NEXT,:REPRAT:FORK=1
TO15:VDU19,X,7;8;:A$=INKEY$(9):VDU19,X,0
;0;:NEXT:UNTIL INKEY-99:MODE 0
                                                                                                                                                                                        350 :
360 DEF PROCcol(x)
920 lb=n%
930 nb=n%+1
940 ns(lb)=leaf$
950 lb(lb)=LEN(leaf$)
960 yk(lb)=yk
970 IF Phtype(f$)=2 PROCdir
980 IF wk(lb)<LEN(leaf$)+2 wk(lb)=LEN(leaf$)+2
990 =wk(lb)
1000 :
1010 DEF PROCdir
1020 LOCAL ib, rb
1030 lb=0
1040 OSCLI*DIR "+f$
1050 REPEAT
1050 DESE
           92Ø 1%=n%
                                                                                                                                                                                       370 COLOUR c(x,1)
380 COLOUR 128+c(x,2)
390 ENDPROC
                                                                                                                                                                                      400 :
410 DEF PROCDOX(X,Y)
420 MOVE X,Y
430 DRAW X+192,Y
440 DRAW X+192,Y-128
450 DRAW X,Y-128
460 DRAW X,Y
470 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         10 REM > lLineWaves (Infol0) By Gareth Moore (C) BAU February 1992
20 MODE1:VDU23;8202;0;0;0;31;31:H=0:I =4:REFRATMOVEO,H:DRAW1279,H:H=H:I:COLOUR IPERINT", Waves of lines upon ";10cloUR 2:FRINT;"background text!";:IFH MOD32=0I =-I:UNTIL0ELSEUNTIL0
                                                                                                                                                                                       480 :
490 DEF PROCresistor(r)
                                                                                                                                                                                   480 : 1
490 DEF PROCresistor(r)
500 MOVE 2*64-8,3*32
510 PLOT 14,2*644-64*r,3*32
520 PLOT 14,2*644-64*r,32-4
530 PLOT 14,2*64-8,32-4
540 PLOT 14,2*64-8,33-2
550 MOVE 1*64-8,2.5*32
550 MOVE 1*64-8,2.5*32
570 MOVE 1*64-8,1.5*32
580 PLOT 14,2*64-8,1.5*32
580 PLOT 14,2*64-8,1.5*32
600 PLOT 14,2*64-8,1.5*32
610 MOVE (3*bands)*64,2.5*32
610 MOVE (3*bands)*64,2.5*32
620 PLOT 14,(2*bands)*64,1.5*32
630 ENDPROC
640 : 650 DEF PROCKeys
660 IF INKEY(-74) PROCSe
ect
    1210 DATA 0.0.1.0.1.1.1.3.3.3.2.2.4.4.5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 11
                                                                                                                                                                                                                                                                                                                                                             ,4,0,7,7,7
1220 DATA Black,Brown,Red,Orange,Yellow
,Green,Blue,Violet,Grey,White
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         10 REM >1LineDemo (Info11) By Adrian
Dale (C) BAU February 1992
20 MODES:GCOL3,7:REPEATX:RND(640):Y=R
NO[512):RECTANGLEFILL X,Y,X,Y:UNTILX<2:H
=0:X=100:Y=0:I=5:GCOL3,1:REPEATCIRCLE FI
LL X,Y,100:MAIT:CIRCLE FILL X,Y,100:X+=I
LL X,Y,100:SCHAD(H):100:H=(H:H):MD180:X
                                                                                                                                                                                                                                                                                                                                                            Listing 8
                                                                                                                                                                                                                                                                                                                                                                      10 REM >TESTC (Info8)
20 REM Sends text files to !Edit
30 REM By Dave Lawrence
40 REM For Archimedes only
50 REM (C) BAU February 1992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          :Y=700*ABS(SINRAD(H))+100:H=(H+1)MOD180:
IF ABS(X-640)>540 I=-I:UNTIL0 ELSE UNTIL
                                                                                                                                                                                                                                                                                                                                                                        60 :
70 DIM code 4000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 12
                                                                                                                                                                             660 IF INKEY(-99) OR INKEY(-74) PROCSe
lect
670 IF (INKEY(-18) OR INKEY(-116) OR I
NKEY(-109)) AND bands-4 PROCresistor(band
8):PROCdelete:bands-3:PROCresistor(band
8):PRINT TAB(0,23);"3"
680 IF (INKEY(-19) OR INKEY(-21) OR IN
KEY(-123)) AND bands-3: PROCresistor(band
9):PROCdelete:bands-4:PROCresistor(band
5):PRINT TAB(0,23);"4"
690 IF INKEY(-90) OR INKEY(-76) PROCde
lete
                                                                                                                                                                                                                                                                                                                                                                    80 wp=12
90 sp=13
100 link=14
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1220 | %=1%=1

1230 | %=1%=1

1240 UNTIL | ?| %=32

1250 | 7| %=13

1260 | s=s (q%+1)

1270 | t%=Fhtype(s%)

1280 | w*(1%)=v%(1%)+Fhbranch(f$+"."+s$,s

.v*_*1)
                                                                                                                                                                                                                                                                                                                                                             90 8pm3)
100 link=14
110 pc=15
120 FOR pass=0 TO 2 STEP 2:P%=code
130 [OPT pass
140 STMFD (sp)1, (RO-R2, link)
150 MOV R0, #0
160 STR R0, [wp, #8]
180 STR R0, [wp, #8]
180 STR R0, [wp, #12]
190 STR R0, [wp, #20]
200 STR R0, [wp, #24]
210 STR R0, [wp, #24]
220 STR R0, [wp, #35]
230 STR R0, [wp, #36]
240 MOV R0, #5
250 STR R0, [wp, #16]
1280 %(1%)=\%(1%)+FNbranch($,1%)+FNbranch($,1%)+FNbranch($1290 IF t%=2 OSCLI"DIR "+f$,1300 ENDPROC 1310: 1310 DEF FNtype(f$),1310 $q%=f$,1340 lbk=q%,1350 Ax=5,1360 =USR(&FFDD) AND &FF
                                                                                                                                                                            690 IF INKEY(-90) OR INKEY(-76) PROCCE
lete
700 o=n
710 n=n+(INKEY(-58) OR INKEY(-26))-(IN
KEY(-42) OR INKEY(-122))
720 IF n=-1 n=9
730 IF n=10 n=0
740 IF o<n PROCCUrsor:REPEAT UNTIL (I
NKEY(-122))=0
750 ENDEROC
760:
770 DEF PROCCURSOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       10 REM > LLinePaint (Infol3) By Gavin Sallery (c) BAU February 1992 20 MODE15:OFF:OSCLT*POINTER*:VDU24,0; 0;1279;990;:FORX=128TO192:COLOURX:VDU32: NEXT:-co==10:REPEATCOLOURC+:29:FRINTTAB (70,0);s;SPC(2):MOUSEX,y,b:c=c+((ABS(y>991)*((x/16)-c))*((b AND4)>2)):s=(s+((b AND2)>1)) MOD21:WHILE b AND2:FORD=-4000TO-1:NEXT:ENDWHILE:OGLC TINTO:WHILE b AND 41-b0-CIRCUE FILLX,y,s:ENDWHILE:UNTIL b AND1:VDU30:COLOUR128:INPUTf$:IFf$<>*"OSCLT*SCR."+f$
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    10 REM >1LinePaint (Infol3) By Gavin
                                                                                                                                                                                                                                                                                                                                                                  240 MOV
250 STR
260 MOV
270 ORR
280 STR
290 MOV
  Listing 7
                                                                                                                                                                                                                                                                                                                                                                                                               RØ, [wp, #16]
RØ, #&FF
            10 REM >Resistor (Info7)
20 REM by Andy Gibbons
30 REM for all machines
40 REM (c) BAU February 1992
                                                                                                                                                                                                                                                                                                                                                                                                                RØ. RØ. #&FØ0
                                                                                                                                                                                        770 DEF PROCEURSOR
                                                                                                                                                                                      780 PROCCOL(o)
790 PRINT TAB(o+1,(o*3)+1);a$
800 COLOUR 128:COLOUR 7
                                                                                                                                                                                                                                                                                                                                                                   310 .copyname
320 LDRB RØ,[R1],#1
                                                                                                                                                                                                                                                                                                                                                                                              The A To Z OF Beeb Programming
                                                                                                                                                                                                                                                                                                                                                           230 DRAW x(0)*b*bb*x(1)*a*bb*x(2)*b*a
a*x(3)*a*aa,y(0)*b*bb*y(1)*a*bb*y(2)*b*a
a*y(3)*a*aa
240 NEXT
250 ENDPROC
                                                                                                                                                                                      240 ENDPROC
  Listing A
                                                                                                                                                                              Listing B
        10 REM >A
20:
20:
30 MODE 1
40 a%=0
55 c%=1
60 REPEAT
70 GCOL 1,c%
80 PROCPLOI(a%)
90 *PX 19
100 VDU 19,c%,7,0,0,0,19,3-c%,0,0,0,0
110 GCOL 2,c%
120 PROCPLOI(a%-5)
120 PROCPLOI(a%-5)
130 c%=3-c%
140 a%=(a%=5) MOD 360
150 UNTIL PALSE
160:
170 DEF PROCPLOI(a%)
180 FOR i%=0 TO 10
190 x%=540+400*COS(RAD(a%))
200 y%=512+400*SIN(RAD(a%))
210 a%=a%=1444
220 IF i%=0 MOVE x%,y% ELSE DRAW x%,y
             10 REM >A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  210 NEXT
220 END
                                                                                                                                                                                          10 REM >B
                                                                                                                                                                                         20 :
30 MODE 0
40 DIM x(3),y(3)
50 n=100
60 x(0)=0:y(0)=510
70 x(3)=1280:y(3)=510
80 FOR r%=0 TO 5000 STEP 300
90 PROCPLOt(1280/3,510+r%,1280*2/3,5
r%)
                                                                                                                                                                                                                                                                                                                                                            Listing C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing D
                                                                                                                                                                                                                                                                                                                                                                        10 REM >C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     10 REM >D
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     30 MODE Ø
                                                                                                                                                                                                                                                                                                                                                                        30 VDU 23,224,170,85,170,85,170,85,17
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                30 ROLE 0
30 ROLE 0
50 n=870
60 oswrch=$FFEE
70 FOR pass%=0 TO 2 STEP 2
80 P%=code%
90 [OFT pass%
100 .decimal
110 LDY #0
120 .numloop1
130 LDX #16
140 LDA #0
150 .numloop2
160 ASL n
170 ROL n+1
180 ROL A
190 CMF #10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      40 DIM code% &100
                                                                                                                                                                                                                                                                                                                                                                        40 FOR mode%=0 TO 2
                                                                                                                                                                                                                                                                                                                                                                   40 FOR mode%=0 TO 2
50 MODE mode%
60 PRINT'Mode ";mode%
70 c%=2' (mode%+1)
80 IF c%=8 c%=8
90 x%=16/c%
100 FOR i%=0 TO c%-1
110 COLOUR 128+1%
120 FOR j%=i% TO c%-1
130 COLOUR j%
140 FOR y%=3*i% TO 3*i%+2
150 PRINTTAB(x%+j%, 2+y%) STRING$(x%
HHS224)
                                                                                                                                                                             90 FRO
10-r%)
100 NEXT
110 END
                                                                                                                                                                                     120 :
130 DEF PROCPIOt(cx1,cy1,cx2,cy2)
140 MOVE x(0),y(0)
150 x(1)=cx1+2*x(0)
160 y(1)=cy1+2*y(0)
170 x(2)=cx2+2*x(3)
180 y(2)=cy2+2*y(3)
190 FOR a=0 TO 1 STEP 1/n
200 b=1-a
210 aaaa*a
220 bb=b*b
```

150 PRIN ,CHR\$224) 160 NEXT 170 NEXT

PAGES YELLOW

```
390 DATA "It is often necessary to int
elligently print text"
400 DATA "so that words are not split
at the ends of lines."
410 DATA "Adventure games, wordprocess
ors, presentation software"
420 DATA "and many other applications
can all make use of such"
430 DATA "a facility."
440 DATA ""
                                                                                                                                                                                     90:
100 DEF PROCitalic(i$)
110 X$=c$ MOD 256
120 Y$=c$ DIV 256
130 A$=10
140 FOR i$=1 TO LEN(i$)
150 ?c$=ASC(MID$(i$, i$, i$, i))
160 CALL osword
170 VDU 23, 224, c$12/2, c$23, c$?
4, c$25, c$26, c$27, 2, c$28, 2, 224
180 NEXT
190 FRINT
200 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                     18Ø END
      200 BCC less
210 SBC #10
220 INC n
230 .less
240 DEX
250 BHE numloop2
260 PHA
270 INY
280 LDA n
290 ORA n-1
300 BNE numloop1
310 .shownum
320 PLA
330 BCR #48
                                                                                                                                                                                                                                                                                                                                                                                     190 :
200 DEF PROCadd_to_list(v%)
                                                                                                                                                                                                                                                                                                                                                                                     210 a%=wk%+12*n%
220 n%=n%+1
                                                                                                                                                                                                                                                                                                                                                                                     240 IF n%=1 p%=a%:a%!4=-1:a%!8=-1:ENDP
                                                                                                                                                                                                                                                                                                                                                                             250 pp%=p%
250 pp%=p%
260 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                     270 IF !pp%>v% AND pp%!4<>-1 pp%=pp%!
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Listing Q
                                                                                                                                                                                                                                                                                                                                                                            4
280 UNTIL !pp%<=v% OR pp%!4=-1
290 IF !pp%>v% pp%!4=a%:a%!4=-1:a%!8=p
p%:EMDEROC
300 a%!4=pp%
310 a%!8=pp%!8
320 IF pp%!8=-1 p%=a% ELSE !(pp%!8+4)=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            10 REM >Q
20:
30 MODE 0
40 n=120
50 DIM a$(n)
60 PRINT"Sorting ";n;" strings..."
70 FOR i=0 TO n-1
90 FOR j=1 TO 3
90 a$(i)=a$(i)+CHR$(64+RND(26))
100 NEXT
110 PRINTHA$(i)" ";
                                                                                                                                                                                      Listing J
          340 JSR oswrch
          350 DEY
360 BNE shownum
                                                                                                                                                                                                   10 REM >J
          370 RTS
                                                                                                                                                                                                                                                                                                                                                                            a%
330 pp%18=a%
340 ENDPROC
          38Ø ]
39Ø NEXT
                                                                                                                                                                                                   40 osrdch=&FFE0:oswrch=&FFEE:osnewl=&
                                                                                                                                                                                             40 osrdch=EFFEG:oswrch=EFFE

55 DIM code% £100
66 FOR pass%=0 TO 2 STEP 2

70 P%=code%
80 (DFT pass%
90 .code
100 JSR osrdch
110 CMP #27
120 BEQ out
130 SEC
140 SEC #49
150 BCC code
160 CMP #3
170 BCS code
180 ASL A
190 TAX
200 LDA jumptable, X
210 STA £70
220 LDA jumptable+1, X
230 JTA £71
240 JMP (£78)
        339 NEXT
400 FOR test%=1 TO 10
410 | In=RND(&18000) -1
420 | PRINT*BABICC ", in;", M/C :";
430 | CALL decimal
440 | PRINT
450 NEXT
460 END
                                                                                                                                                                                                                                                                                                                                                                              Listing M
                                                                                                                                                                                                                                                                                                                                                                                          10 REM >M
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              120 NEXT
130 PRINT
                                                                                                                                                                                                                                                                                                                                                                              10 REM >N
20:
30 MODE2:s=255:DIMC s:FORn=1TOs:c?n=7
-**LOG(n)/LOG(s):NEXT:m=256:1=2.5/m:FOR]
=TOT127:FORM-#OT255:un=1:f'=2-2:un+f'*-1.25
:n=-1:x=0:y=0:REPEATf=y*y:e=x*x:y=2*x*y+
v:x=e-f-u:n=n+1:UNTILn=s ORe+f>=4:GCOL0,
c7n:PLOT69, 8*j,4*k:NEXT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              140 PROCqsort (0,n)
150 FOR i=0 TO n-1
160 PRINTa$(i)""
 Listing E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             170 NEXT
180 END
10 REM >E
20:
30 MODE 0
40 VDU 28,0,20,79,0
50 k%=10000
60 FOR 3%=2 TO SQR(k%)
70 IF POINT(2*(8% MOD 640),4*(8% DIV 640))=0 FOR 1%=5%*2 TO k% STEP 5%:PLOT 69,2*(1% MOD 640),4*(1% DIV 640):NEXT 80 NEXT
90 FOR 1%=2 TO k%
100 IF POINT(2*(1% MOD 640),4*(1% DIV 640))=0 PRINT LEPTS(STR$1%+STRING$(8," "),8);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              200 DEF PROCOSORt (a%, b%)
                                                                                                                                                                                                                                                                                                                                                                              Listing N
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             280 DEF PROCquort(a%,b%)
210 LOCAL $210 LOCAL $4
220 P$=a%-1
230 REPEAT
240 P$=P$+1
250 UNTIL P$=b% OR a$(p%)<>a$(a%)
260 IF P$=b% ENDFRCC
270 IF a$(a%)>a$(p%) p$=a$(a%) ELSE p$
$(c%)
                                                                                                                                                                                                                                                                                                                                                                                          10 REM >N
                                                                                                                                                                                                                                                                                                                                                                                          20 :
30 MODE 4
40 a%=&FFFF
                                                                                                                                                                                                                                                                                                                                                                                           50 b%=0
60 PRINT"Z and X select, C clears, S
                                                                                                                                                                                              230 STA W11
240 JMP (670)
250 .out
260 RTS
270 :
280 .jumptable
290 EQUM j1
300 EQUM j2
310 EQUM j3
320 :
330 .j1
340 LDX #mess1 MOD 256
350 LDY #mess1 DIV 256
360 JMP showmess
370 .j2
380 LDX #mess2 MOD 256
390 LDY #mess2 DIV 256
400 JMP showmess
                                                                                                                                                                                                 240 JMP (&70)
                                                                                                                                                                                                                                                                                                                                                                                            70 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              290 j%=b%-1
300 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                    70 REPEAT
80 PRINTTAB(0,5)FNbin(a%)
90 PRINTTAB(25,5)"&"; a%;SPC8
100 PRINTTAB(0,6)SPC16;TAB(b%,6)"^"
110 key%=INSTR(" ZZXXCCSS",GET$) DIV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    310 REPEAT
320 IF a$(k$)<p$ k$=k$+1
330 UNTL a$(k$)>=p$
340 REPEAT
350 IF a$(j$)>=p$ j$=j$-1
360 UNTL a$(j$)<p$
370 IF k$(j$ cp$
370 IF k$(j$ cp$);a$(j$)=a$(k$):
a$(k$)=t$;j$=j$-1;k$=k$-1
380 UNTL k$j$
390 PROCQBOTL(a$,k$)
400 PROCQBOTL(a$,k$)
410 ENDPROC
        110 NEXT
120 END
  Listing F
                                                                                                                                                                                                                                                                                                                                                                                     120 IF key%=1 b%=(b%+15) MOD 16
130 IF key%=2 b%=(b%+1) MOD 16
140 IF key%=3 a%=a% AND NOT (2^(15-b%
               20 :
30 PRINT"Please enter the name of a c
                                                                                                                                                                                                                                                                                                                                                                                      150 IF key%=4 a%=a% OR (2^(15-b%))
160 UNTIL FALSE
170 END
  ountry:"
40 ON ERROR IF ERR=29 PRINT"...I don'
t know!" ELSE REPORT:PRINT" at line ";ER
      FRINT"...I don'
for REPORT:PRINT" at line ";ER
for INFUT"=>"country$
for PRINT"The capital of "country$" i
"EVAL("FN"+FNIc(country$))
for FRINT"The Country$)
for FRINT"The Country$)
   L:END
                                                                                                                                                                                                                                                                                                                                                                                       180 :
190 DEF FNbin(a%)
                                                                                                                                                                                               400 JMP showmess 1410 .j3
410 JMS #mess3 MOD 256
430 LDY #mess3 DIV 256
430 LDY #mess3 DIV 256
440 .showmess
450 STX £72
460 STY £73
470 LDY #0
480 .showloop
490 LDA £72), Y
500 BEQ shown
510 JSR oswrch
520 LNY
530 BNE showloop
540 .shown
550 JMS csnewl
550 JMP code
570 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Listing R
                                                                                                                                                                                                                                                                                                                                                                              190 d5="RNDIN(d*)
200 d5=""
210 FOR i%=15 TO 0 STEP -1
220 IF (a% AND 2'i%) a$=a$+"1" ELSE a
$=a$+"0"
230 NEXT
240 =a$
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  10 REM >R
20 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             30 MODE 1
40 by%=-100
50 bz%=-500
60 radius%=300
70 sy%=-450
80 wzp%=-300
90 y=0
100 VDU 19,1,4,0,0,0,19,2,5,0,0,0
110 PRINT"BBC Acorn User"
120 FOR x%=-540 TO 640 STEP 4
130 FOR y%=-512 TO 0 STEP 4
140 xrat=(1-x%) /(wzp%)
150 vecl=wzp%/wzp%
170 a=xrat^2+yrat^2+1
180 b=2*(xrat*(vecl)+yrat*(-by%)-bz%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   30 MODE 1
          90 :
100 DEF PNbritain="London"
110 DEF PNbritain="Dublin"
120 DEF PNfrance="Paris"
130 DEF PNfrance="Paris"
140 DEF PNfrance="Paris"
150 :
160 DEF PNlc(a$)
170 b$=""
                                                                                                                                                                                                                                                                                                                                                                               Listing O
                                                                                                                                                                                                                                                                                                                                                                              10 REM >0
20:
30:
30:
MODE4:DIMg(40,20,1):FORi=1T099:g(R
ND(40)-1,RD(20)-1,1)=1:NEXT:REPEATb=1-b
:VDU30:FORy=0T019:FORx=0T039:o=g(x,y,b):
VDU32+3*o:c=-g(x,y,b):FOR]=39T041:FORk=1
97021:c=-g((x+j))MD40(y+k)MD20,b):NEX
T;g(x,y,1-b)=-0*(c=2)-(c=3):NEXT;UNTIL
          170 b$=""
180 FOR i%=1 TO LEN(a$)
190 a%=ASC(MID$(a$,1%,1))
200 IF a%>=ASC"A" AND a%<=ASC"Z" a%=a
                                                                                                                                                                                                 570 :
           210 b$=b$+CHR$(a%)
                                                                                                                                                                                                 580 .mess1 EOUS "You pressed key 1":EO
          220 NEXT
230 =b$
                                                                                                                                                                                        UB Ø
                                                                                                                                                                                                                                                                                                                                                                                Listing P
                                                                                                                                                                                                 590 .mess2 EQUS "You pressed key 2":EQ
                                                                                                                                                                                       UB Ø
   Listing G
                                                                                                                                                                                                                                                                                                                                                                                          10 REM >P
                                                                                                                                                                                                 600 .mess3 EOUS "You pressed key 3":EO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    US% 2
200 root=(b*b)-4*a*c
210 y=0
220 col%=0
230 IF root>=0 PROCsphere:IF y>sy% P
ROCreflect BLSE PROCsurface
240 IF col%-12
250 IF (x*+y%) MOD 8=0 GCOL 0,col% D
IV 4 ELSE GCOL 0,col% DIV 4+(col% DIV 2)
MOD 2
260 PLOT 60 640
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               c=((vec1)^2+(-bv%)^2+bz%^2)-radi
                                                                                                                                                                                                                                                                                                                                                                                     10 REM >P
20:
30 MODE 4
40 PROCtest(0,7,39,0)
50 PROCtest(3,16,36,8)
60 PROCtest(8,28,31,18)
70 END
80:
90 DEF PROCtest(1,d,r,u)
110 RESTORE
120 REPEAT
130 READ t$
140 PROCTEST(t$,r-1+1)
150 UNTIL t$=""
160 ENDPROC
170:
                                                                                                                                                                                        UB 0
                                                                                                                                                                                               3 0
610 ]
620 NEXT pass%
630 PRINT"Press 1, 2 or 3"
640 CALL code
650 END
               10 REM >G
               20 :

30 i=0

40 PRINT "I must not use GOTO!"

50 i=i+1

60 IF i<32 GOTO 40
                                                                                                                                                                                         Listing K
   Listing H
                                                                                                                                                                                                10 REM > 3
20:
30 REPEAT
40 *FX 178,0
50 FOR %=1 TO 127
60 IF INKEY-1% PRINTI%
70 MEXT
80 UNTIL INKEY-113
90 *FX 178,255
100 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              MOD 2
260 PLOT 69,640+x%,512+y%
270 NEXT
280 NEXT
290 END
               10 REM >H
               30 MODE 1
40 FOR 1%=0 TO 1
50 FOR 1%=0 TO 1023 STEP 4
60 %=1% MOD 128
70 IF w4:64 w4:128-w4
80 IF 1%=0 x%=w% ELSE x%=1279-w4
90 IF 1%=0 MOVE x%,1% ELSE DRAW x%,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                300 :
310 DEF PROCunitvec(xe,ye,ze)
                                                                                                                                                                                                                                                                                                                                                                                       170 :
180 DEF PROCPRETTY(t$,w)
190 IF POS>0 VDU 32
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                320 ul=SQR(xe*xe+ye*ye+ze*ze)
330 xu=xe/ul:yu=ye/ul:zu=ze/ul
340 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                         200 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               350 :
360 DEF FNdotprod(x1,y1,z1,x2,y2,z2)
370 =x1*x2+y1*y2+z1*z2
                                                                                                                                                                                                                                                                                                                                                                                       210 REPEAT
220 IF ASC(t$)=32 t$=RIGHT$(t$,LEN(t
                                                                                                                                                                                         Listing L
           100 NEXT
          100 NEXT
110 NEXT
120 FOR i%=0 TO 1023 STEP 4
130 GCOL 0,1+i% MOD 3
140 PLOT 77,640,i%
150 NEXT
160 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               370 =x1*x2+y1*y2+z1*z2
380 :
390 DEF PROCSphere
460 z0s(-b+SQR(root))/(2*a)
410 z1s(-b-SQR(root))/(2*a)
420 IF z0>z1 z=z0 ELSE z=z1
430 x=xxat*z+vez
440 =yyxat*
450 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                       -1)
230 UNTIL ASC(t$)<>32
240 IF POS+LEN(t$)<w PRINT t$::t$="
                                                                                                                                                                                                     10 REM >L
                                                                                                                                                                                                     30 MODE 4
40 DIM wk% 2000
                                                                                                                                                                                                                                                                                                                                                                                ELSE PROCSEGMENT
250 UNTIL t$=""
260 ENDPROC
                                                                                                                                                                                                     40 DIM wk% 2000
50 p%=-1
60 n%=0
70 FOR i%=1 TO 150
80 PRINTCHR$13;1%;
90 PROCADD_to_list
   Listing I
                                                                                                                                                                                                                                                                                                                                                                                         280 DEF PROCsegment
                                                                                                                                                                                                70 FOR i%=1 TO 150
80 PRINTCHR$13;1%;
90 PROCADd_to_list(RND(1000))
100 NEXT
110 CLS
120 pp%=p%
130 REPEAT
140 v%=1pp%
150 PRINT LEFT$(STR$(v%)+STRING$(5,")
1,5);
160 pp%=pp%!4
170 UNTIL pp%=-1
                                                                                                                                                                                                                                                                                                                                                                                      280 DEF PROCSegment
290 j%=-1
300 FOR i%=1 TO W-POS
310 IF MID$(t$, i%, i)=" j%=i%
320 NEXT
320 NEXT
330 IF j%=-1 AND POS>0 PRINT: ENDPROC
340 IF j%=-1 j%=-POS
350 PRINT: ET j%=-FOS
350 PRINT: ET$(t$, j%-1)
360 t$=RIGHT$(t$, j, k-1)
360 t$=RIGHT$(t$, j
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           450 ENDPROC
460 :
470 DEF PROCreflect
480 PROCunitvec(x,y-by%,z-bz%)
490 xnexu;yn=yu:zn=zu
500 xr=2*xn*zn;yr=2*yn*zn:zr=2*zn*zn-1
510 IF yr:0 THEN xd=xr:yd=yr:zd=zz:st=(y-y%)/ydx=xxd*st:z=zd*st:i=FNbau(-x,z
ELGE i=0
520 PROCunitvec(1-x,-y,-z)
530 ldn=FNdotprod(xn,yn,zn,xu,yu,zu)
   10 REM >1
20:
30 MODE 4
40 DIM c% 10
50 oswordsEFFP1
60 PROCItalic("Now is the time for al
1 good men")
70 PROCitalic("to come to the aid of
the party.")
80 END
```

```
540 xv=xu:yv=yu:zv=zu

550 PROCunitvec(xr,yr,zr)

560 rdv=Ndotprod(xu,yu,zu,xv,yv,zv)

570 r=59((1-x)^2+y^2+x^2)

580 i2=(2000/(r+20))*(0.1*ldn+2*(rdv^6
                                                                                                                                              520 $s%="Now is the time for all good
men to come to the aid of the party. "
530 PRINT"Scrolling text..."
540 REPEAT
550 *FX 19
560 CALL scroll
570 UNTIL FALSE
                                                                                                                                                                                                                                                                                                       60 NEXT
70 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                  380 BEQ shownerr
390 JSR oswrch
                                                                                                                                                                                                                                                                                            70 KEFEAT
80 REPEAT
90 INPUTENTER valid date in form D
D/MM/YY "date$
100 date%=FNpar
110 month%=FNpar
120 year%=FNpar
130 UNTIL FNvalid_date(date%,month%,y
                                                                                                                                                                                                                                                                                                                                                                                                                                                   400 INY
410 BNE showerr
                                                                                                                                                                                                                                                                                                                                                                                                                                                 410 BNE showerr
420 .shownerr
420 .shownerr
430 LDA #SACC)"
440 JSR oswrch
450 LDX sp
460 TXS
470 JMP restore
480 .sp EQUB 0
500 ]
510 NEXT pass%
520 ?userv=line }
 580 12=(2000/(r+20))*(0.1*1dn(

5))

590 IF 12<0 12=0

600 i=1+12

610 IF i>12 i=12

620 IF i>0 col%=i ELSE col%=0

630 ENDPROC
                                                                                                                                               Listing T
                                                                                                                                                                                                                                                                                            uars)
140 PRINT d$((FNday_number(date%,mont h*,year%)) MOD 7)"day"
150 UNTIL FALSE
160 END
820 1:
630 EMDROC
640 :
650 DEP PROCSULTACE
650 DEP PROCSULTACE
650 IF y%=0 OR WID%=0 ENDROC
670 SI=WID%=0 WIDFOC
670 SI=WID%=0 WIDFOC
690 SX=(X**SI=SI=V*)*/WID%
700 XX=(1-sx)*/-(-SI)
710 YATESY%SI
720 axx=12*Yx=12+1
730 b=2*(YX=1*-1-1)
740 c=(-by%)*2*bz%*2*radius%*2
750 root=b*-b*-4*a*c
750 col%=4
770 IF root=0 OR Y<SY% PROCUNITYCC(SX-1,SY%,SI):i=-SY%UL:IF i>=0 col%=4+i*4
780 col%=0**ENDAU(SX,SI)
790 ENDROC
800 :
810 DEF FNDAU(XDOS%,ZDOS%)
810 DEF FNDAU(XDOS%,ZDOS%)
810 DEF FNDAU(XDOS%,ZDOS%)
                                                                                                                                                          10 REM >T
                                                                                                                                                          20 :
30 MODE 1
                                                                                                                                                         30 MODE 1

40 oy=2000;s=1200

50 DIM s(12),c(12)

60 FOR i%=0 TO 12

70 s(i%)=SINRAD(i%*30)

80 c(i%)=COSRAD(i%*30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                  520 ?userv=line MOD 256
530 userv?l=line DIV 256
540 *LINE CAT
550 *LINE DOG
                                                                                                                                                                                                                                                                                                     180 DEF FNm(month%, year%)
                                                                                                                                                                                                                                                                                            190 IF month%=4 OR month%=6 OR month%=
9 OR month%=11 THEN =30
200 IF month%<>2 THEN =31
210 IF year% MOD 4=0 THEN =29 ELSE =28
                                                                                                                                                      80 c(1%)=COSRAD(1%*30)
90 NEXT
100 VDU 29,640;512;
110 FOR a%=0 TO 11
120 FROCfacet(a%,280,50,350,400)
130 FROCfacet(a%,50,0,280,50)
140 FROCfacet(a%,50,400,750,0)
150 FROCfacet(a%,300,-450,50,-400)
160 NEXT
170 END
180:
190 DEP FROCfacet(a%,70,20,r1,z1)
200 xx8=r0*c(a%):yy0=cy+r0*s(a%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                   560 *LINE DIR NOSUCHDIR
                                                                                                                                                                                                                                                                                                                                                                                                                                                  57Ø END
                                                                                                                                                                                                                                                                                             220:
230 DEF FNPAT
240 IF date$="" THEN =0
250 v%=VAL(date$)
260 i%=INSTR(date$,"/")
270 IF i%=0 i%=INSTR(date$,",")
280 IF i%>0 date$=MID$(date$,i%+1,LEN(date$,-i%) ELSE date$=""
290 =v%
300:
                                                                                                                                                                                                                                                                                                                                                                                                                                           Listing Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                     10 REM >Y
20 :
                                                                                                                                                                                                                                                                                                                                                                                                                                           20:
30 MODE 3
40 REPEAT
50 UNTIL NOT FNyorn("Do you want to a
newer this question again")
60 END
                                                                                                                                                     180 ;

190 DEF PROCfacet(a%,r0,z0,r1,z1)

200 xx0=r0*c(a%);yy0=oy+r0*s(a%)

210 xx1=r0*c(a%);yy1=oy+r0*s(a%+1)

220 xx2=r1*c(a%);yy2=oy+r1*s(a%)

230 xx3=r1*c(a%);yy3=oy+r1*s(a%+1)
                                                                                                                                                                                                                                                                                                     300 :
310 DEF FNvalid_date(date%,month%,year
                                                                                                                                                                                                                                                                                                                                                                                                                                                      80 DEF FNyorn(q$)
         830 IF xpos%<0 xp%=479-xp%
840 =POINT(xp%, 992+(ABS(zpos%/2) MOD 3
                                                                                                                                                                                                                                                                                                   320 IF year%<1 OR year%>99 THEN =FALSE
330 IF month%<1 OR month%>12 THEN =FAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                   90 LOCAL Y%
100 PRINT q$"? (Y/N)";
                                                                                                                                                      240 xa=xx0*s/yy0:ya=z0*s/yy0
250 xb=xx1*s/yy1:yb=z0*s/yy1
260 xc=xx2*s/yy2:yc=z1*s/yy2
270 xd=xx3*s/yy3:yd=z1*s/yy3
                                                                                                                                                                                                                                                                                                                                                                                                                                                 120 y%=INSTR(" YyNn",GET$) DIV 2
130 UNTIL y%=0
140 IF y%=1 PRINT"y" ELSE PRINT"n"
150 =y%-2
   Listing S
                                                                                                                                                                                                                                                                                                    340 = (date%>=1 AND date%<=FNm(month%,y
                                                                                                                                                      270 xd=xx3*s/yy3;yd=21*s/yy3
280 GCCL 0,12 MOVE xb,yb
300 PLOT 85,xc,yc:PLOT 85,xd,yd
310 GCCL 0,0
320 DRAW xb,yb:DRAW xa,ya
330 DRAW xc,yc:DRAW xd,yd
340 ENDPROC
           10 REM >S
         20:
30 MODE 4
40 DIM code% &100,8% &100
50 oswrch=&FFEE
60 b%=&5800+5*320
70 FOR pass%=0 TO 2 STEP 2
80 P%=code%
90 [OPT pass%
100 .scroll
110 LDX #7
120 .locol
                                                                                                                                                                                                                                                                                                    360 DEF FNday_number(date%,month%,year
                                                                                                                                                                                                                                                                                             %)
370 d%=0
380 IF month%>1 FOR m%=1 TO month%-1:d
%=d%+FMm(m%,year%):NEXT
390 =d%+year%*365+year% DIV 4+date%
400:
410 DATA Sun,Mon,Tues,Wednes,Thurs,Fri
                                                                                                                                                                                                                                                                                                                                                                                                                                            Listing Z
                                                                                                                                                                                                                                                                                                                                                                                                                                                      10 REM >Z
                                                                                                                                                                                                                                                                                                                                                                                                                                                  20 :
30 DIM code% &100
40 oswrch=&FFEE
50 FOR pass%=0 TO 3 STEP 3
60 P%=code%
70 [OPT pass%
80 .xversion
90 LDX #0
100 .xlcop
110 LDA &70 X
120 BEQ donex
130 JSR oswrch
140 INX
                                                                                                                                                Listing U
                                                                                                                                                          10 REM >U
20 :
                                                                                                                                                                                                                                                                                             Listing X
          120 .loop1
130 CLC
                                                                                                                                                          20 :
30 userV=&200
                                                                                                                                                                                                                                                                                                       10 REM >X
                                                                                                                                                          40 oswrch=&FFEE
50 DIM code% &100
         150 FOR col%=39 TO 0 STEP -1
                                                                                                                                                                                                                                                                                                       20 :
30 DIM code% &100
40 userv=&200
50 brkv=&202
         160 [OPT pass%
170 ROL b%+8*col%,X
                                                                                                                                                          60 P%=code%
70 [OPT 2
                                                                                                                                                          80 .user
90 TXA
         180 )
190 NEXT
200 [OPT pass%
210 DEX
220 BMI done
230 JMP loop1
240 .done
                                                                                                                                                                                                                                                                                                       60 oscli=&FFF7
                                                                                                                                                                                                                                                                                                                                                                                                                                                   140 INX
                                                                                                                                                                                                                                                                                                                                                                                                                                                   150 BNE xloop
                                                                                                                                                       100 .loop
110 JSR oswrch
                                                                                                                                                                                                                                                                                                        70 oswrch=&FFEE
                                                                                                                                                                                                                                                                                                        8Ø FOR pass%=Ø TO 2 STEP 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                   160 .donex
170 RTS
180 .endofx
190 :
                                                                                                                                                       120 DEY
130 BNE loop
140 RTS
                                                                                                                                                                                                                                                                                                     90 P%=code%
100 [OPT pass%
                                                                                                                                                                                                                                                                                                     110 .line
120 LDA brkv
         240 .done

250 DEC bit

260 BNE notnew

270 LDA #8

280 STA bit

290 LDX byte

300 LDA #31

310 JSR oswrch

320 LDA #39
                                                                                                                                                                                                                                                                                                                                                                                                                                                 190 :
200 .yversion
210 LDY #0
220 .yloop
230 LDA £70,Y
240 BEQ doney
250 JSR oswrch
260 INY
270 BNE yloop
280 .doney
290 RTS
300 .endofy
310 ]
                                                                                                                                                                                                                                                                                                    120 LDA brkv
130 PHA
140 LDA brkv+1
150 PHA
160 TXA
170 TSX
180 STX sp
190 TAX
200 LDA #myerr MOD 256
210 STA brkv
220 LDA #myerr DIV 256
230 STA brkv+1
240 JSR oscii
                                                                                                                                                       150 |
160 ?userV=user MOD 256
170 userV?1=user DIV 256
180 *CODE 42,10
190 END
                                                                                                                                               Listing V
         330 JSR oswrch
340 LDA #5
350 JSR oswrch
                                                                                                                                                          10 REM >V
                                                                                                                                                          30 FORN=1T01000
40 REM This works but isn't as good.
         350 JSR oswrch
360 LDA s*,X
370 CMP #32
380 BCS notend
390 LDX #0
400 LDA s*,X
410 .notend
420 INX
430 STX byte
440 JSR oswrch
450 .notnew
460 RTS
470 :
480 .bit EQUB 8
490 .byte EQUB 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                   310 NEXT pass%
320 NEXT pass%
330 FOR 1%=0 TO 13
340 1%?&70=ASC(MID$("BBC Acorn User",
                                                                                                                                                                                                                                                                                                     240 JSR oscli
                                                                                                                                                                                                                                                                                                     250 .restore
260 PLA
270 STA brkv+1
                                                                                                                                                          60 FOR n=1 TO 1000
70 REM ...as this!
80 NEXT
90 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                  350 NEXT
360 247E=0
370 PRINT*Using £70,X: ";
380 CALL xversion
390 PRINT*"Using £70,Y: ";
400 CALL yversion
410 PRINT*"Size of X version: ";endofx
                                                                                                                                                                                                                                                                                                     280 PLA
290 STA brkv
                                                                                                                                                                                                                                                                                                     300 RTS
                                                                                                                                                Listing W
                                                                                                                                                                                                                                                                                                    310 :

320 .myerr

330 LDA #ASC"("

340 JSR oswrch

350 LDY #1

360 .showerr

370 LDA (&FD),Y
                                                                                                                                                         10 REM >W
20 :
30 DIM d$(6)
40 FOR i%=0 TO 6
50 READ d$(i%)
                                                                                                                                                                                                                                                                                                                                                                                                                                            410 FRINT"Size of X version: ";endofy-
xversion 420 PRINT"Size of Y version: ";endofy-
yversion
         500 ]
510 NEXT pass%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Doodle
```

Doogle

```
190 PRINT"Creating !Run file"
200 outfile%=OPENOUT "!Run"
210 BPUT Soutfile%,"! Doodle by Ian Wi
lson (c) BAU Feb 92"
220 BPUT Soutfile%,"!P "".SystemSPath>
""="""" THEN ERROR O Please show me a IS
                                                                                                                                                                                                                                                            370 ENDIF
380 :
390 PRINT "Creating Patterns file"
400 outfile%=OPENOUT"Patterns"
410 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                   580 IF LEPT$(byte$,1)="J" THEN BPUT#ou
tfile$,&AA:BPUT#outfile$,&A9:add%=TRUE
590 IF byte$="ENDOFDATA" THEN add%=TRU
Listing 1
        10 REM >$.MakeDoodle
20 REM Make template, boot and run fi
                                                                                                                                                                                                                                                                                                                                                                                   E
600 IF add%=PALSE THEN BPUT #outfile%,
EVAL("&"+byte$)
610 UNTIL byte$="ENDOFDATA"
620 CLOSE #outfile%
630 OSCLI "SetType "+filename$+" "+typ
                                                                                                                                                                                                                                                             420 ENDIF
                                                                                                                           ystem directory"
230 BPUT #outfile%, "Wimpslot -min 180k
                                                                                                                                                                                                                                                       430 READ pats
440 IF pats: "ENDOFDATA" THEN BPUT #OU
title%, FVAL("6" * pats): UNTIL 0: ELSE
450 CLOSE #OUtfile%
450 ENDIF
470 ENDPROC
         30 REM (c) BAU Feb 92
        40:
50 *DIR $
60 *Cdir !Doodle
70 *DIR !Doodle
                                                                                                                                 240 BPUT #outfile%, "Set Doodle$Dir <0b
                                                                                                                           ey$Dir>"
250 BPUT #outfile%, "RMEnsure Hardcopy
8 RMLoad <0bey$Dir>.Hardcopy"
260 BPUT #outfile%, "<0bey$Dir>.!Runima
         80 :
90 *Cdir BBCFonts
                                                                                                                                                                                                                                                                                                                                                                                          650 :
660 DEF PROCadd(times%,number%)
                                                                                                                                                                                                                                                             490 DEF PROCcreatefile(filename$, type$
      100 PROCrunmenupatterns
110 PROCcreatefile("Templates", "Templa
                                                                                                                                                                                                                                                                                                                                                                                          670 count%=0
680 REPEAT
                                                                                                                                                                                                                                                            500 PRINT"Creating ";type$;" file"
510 outfile%=OPENOUT filename$
520 REPEAT
530 add%=FALSE
                                                                                                                                 270 CLOSE #outfile%
280 *SetType !Run Obey
                                                                                                                                                                                                                                                                                                                                                                                          690 BPUT #outfile%, number%
                                                                                                                          280 *SetType !Run Obey
290 :
300 PRINT "Creating menu file"
310 Outfile%=OPENOUT "Menu"
320 REPRAT
330 READ menu$
340 !F menu$<->*SHOOPDATA" THEN BPUT #o
utfile%,menu$:UNTIL 0: ELSE
350 CLOSE #outfile%
360 *SetType Menu Text
      120 PROCcreatefile("!Sprites", "Sprite"
  130 PRINT"Doodle has been created. You will need to place"
140 PRINT"the HardCopy module from App s disc two inside"
159 PRINT"the directory !Doodle."
150 END
170:
180 DEF PROCrunmenupatterns
                                                                                                                                                                                                                                                                                                                                                                                          710 UNTIL count%=times%
720 ENDPROC
                                                                                                                                                                                                                                                       530 add%=FALSE
540 READ byte$
550 IF LEFT$(byte$,1)="G" THEN PROCADD
(ASC(RIGHT$(byte$)))-63,0) :add%=TRUE
560 IF LEFT$(byte$,1)="H" THEN PROCADD
((ASC(RIGHT$(byte$)))-63,255):add%=TRUE
570 IF LEFT$(byte$,1)="L" THEN PROCADD
((ASC(RIGHT$(byte$)))-63,77):add%=TRUE
                                                                                                                                                                                                                                                                                                                                                                                         730 :
740 DATA ^Doodle,menblk%
750 DATA New Doodle,\new_doodle
760 DATA Info,!info%.guit.\fin
770 DATA Doodle,main_blk%.patterns@
780 DATA \show_patterns,Text@,\system_
```

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```
790 DATA Save, !saver%, \save, Print, \pri
  800 DATA New Doodle, \new_doodle, Patte
 ns
810 DATA patblk%, Show, \show_patterns
820 DATA Design, !design%, Save ECF
830 DATA \save_patterns, ENDOFDATA
  840 :

850 DATA 04,04,04,FF,40,40,40

660 DATA FF,81,42,24,18,18,24

870 DATA 42,81,00,1c,22,41,41

880 DATA 22,1C,00,1C,22,1C,00

890 DATA C1,22,C1,00,ENDOFDATA
  910 DATA HC,GB,GF,GA,A4,GB,58,GB
```

4340 DATA 1A, 61,01,C7,B7,09,GA,HC
4350 DATA 0C,GB,4A,GB,8C,HB,76,GA
4360 DATA 0C,GB,4A,GB,8C,HB,76,GA
4360 DATA 09,GA,FF,HB,0C,BB,76,GB
4370 DATA 09,GA,FF,HB,0C,BB,76,GB
4380 DATA 99,HA,FF,A2,GB,BC,FF,HA
4390 DATA 1A,61,01,C7,CB,09,GA,HC
4440 DATA 0C,GB,A2,GA,00,90,HC
4440 DATA 0C,GB,A2,GA,00,90,HC
4410 DATA 0B,GA,BC,HB,1A,61,01,C7
4420 DATA D1,09,GA,HC,0C,GA,00,BC
4430 DATA D1,09,GA,HC,0C,GA,00,DH
4430 DATA D1,09,GA,HC,0C,GA,00,DH
4440 DATA HB,3D,90,02,CT,F4,4B,0D
4440 DATA 50,65,T4,4C,65,76,5E,20
4440 DATA 50,65,T4,74,65,72,6E,0D
4450 DATA 50,65,T4,74,65,72,6E,0D
4450 DATA 50,65,T4,74,65,72,6E,0D
4450 DATA 48,75,GD,62,65,F3,A,0D
4500 DATA 72,61,64,69,6F,6F,66,0D
4510 DATA 72,61,64,69,6F,6F,66,0D
4510 DATA 72,61,64,69,6F,6F,66,6D

5510 DATA GD, FF, 00, GC, FF, GA, GA, HB, GA 5520 DATA GA, FF, GB, FF, HC, GB, GB, HC, HB

5530 DATA GA,FF,00,HF,HA,00,HC,HF,HA	790 :	1840 sarea!0=0	2850 PROCcreate_icon_menu("Doodle",mx%)
5540 DATA 00, HC, HD, 00, FF, GA, HD, HA, GA 5550 DATA FF, GA, 00, HD, 00, GA, FF, GC, HB	800 DEF PROCMain 810 REPEAT	1850 RESTORE 1860 \$pointer%="doodle"	2860 ELSE 2870 PROCcreate_menu("Doodle.",mx%,my%)
5560 DATA GC,GE,FF,GD,FF,34,01,GA,72 5570 DATA 61,64,69,6F,6F,6E,GC,00,02	820 PROCpol1 830 UNTIL (reason%=17 OR reason%=18) A	1870 SYS "OS_SpriteOp", 256+60, place%, po inter%, sarea TO naught%, one%, two%, three%	2880 ENDIF 2890 WHEN 4 : CASE hnd% OF
5580 DATA GB,0A,00,GE,17,GB,2C,GB,B0 5590 DATA GB,0C,GA,00,IE,IF,77,07,00	ND block%!16=0 840 ENDPROC	1880 SYS "OS_ReadPalette", 0,16 TO,, whit	2900 WHEN -2 : PROCCreate_window 2910 WHEN main% : xe%=mx% : ye%=my% : b
5600 DATA 77,00,77,00,70,IA,00,77,GA 5610 DATA 77,GB,77,GA,77,00,77,00,77	850 : 860 DEF FNiconbar(spname\$)	1890 SYS "OS_ReadPalette",1,16 TO,,blac k%	in%=FNbutton : PROCdraw(4) : drawing%=TR
5620 DATA GA,AA,GA,77,00,IA,IA,GA,AA	870 !block%=-1	1900 place%!60=&FFFFFFFF	2920 CASE ready_for_text% OF
5630 DATA AA,AA,GA,IA,00,77,GA,AA,AA 5640 DATA AA,AA,AA,GA,IC,GA,AA,AA,AA	880 block%!4=0 890 block%!8=0	1910 place%!64=&FFFFFFFF 1920 place%!68=0	2930 WHEN 0 : bin%=FNbutton : PROCdraw(4) : drawing%=TRUE
5650 DATA GA,IA,00,77,00,77,GA,AA,GA 5660 DATA 77,00,IB,77,07,77,GB,77,70	900 block%!12=63 910 block%!16=64	1930 place%!72=0 1940 SYS "OS_SpriteOp", naught%, one%, two	2940 WHEN 1,2 : bin%=FNbutton : PROCdra w(9) : drawing%=TRUE
5670 DATA IA,00,77,GA,00,77,00,77,GB 5680 DATA 77,00,ID,IF,GD,FF,00,GC,FF	920 block%:20=£2102 930 DIM block%:24 (LENspname\$+1)	%,three% 1950 FOR i%=4 TO 1 STEP -1	2950 ENDCASE 2960 WHEN ecfs% : PROCget_pattern
5690 DATA GA,GA,HB,GA,GA,FF,GB,FF,HC 5700 DATA GB,GB,HC,HB,GA,FF,00,HF,HA	940 \$(block%!24)=spname\$ 950 block%!28=sprite%	1960 PROCreadpattern(i%) 1970 PROCsetdesign	2970 WHEN Checker%: CASE icon% OF 2980 WHEN 1: PROCyce
5710 DATA 00, HC, HF, HA, 00, HC, HD, 00, FF	960 block%!32=(LENspname\$+1)	1980 NEXT	2990 WHEN 2 : PROCno
5720 DATA GA,HD,HA,GA,FF,GA,00,HD,00 5730 DATA GA,FF,GC,HB,GC,GE,FF,GD,FF	970 SYS "Wimp_CreateIcon",,block% TO i con%	1990 safe%=TRUE 2000 SYS "Hourglass_Off" 2010 ENDPROC	3000 ENDCASE 3010 WHEN saver% : CASE icon% OF
5740 DATA ENDOFDATA	980 =icon% 990 :	2020 :	3020 WHEN 0 : PROCdrag_save 3030 WHEN 2 : PROCquick_save
Listing 2	1000 DEF PROCsprites(file\$) 1010 sp=OPENIN(file\$)	2030 DEF PROCPOIL 2040 IF drawing% OR rubber% THEN mask%=	3040 ENDCASE 3050 WHEN design% : CASE icon% OF
10 REM >!RunImage 20 REM !Doodle	1020 dim%=EXT#sp+16+2000 1030 CLOSE#sp	on% ELSE mask%=off% 2050 !block%=mask%	3060 WHEN 69 : PROCreadpattern(1) 3070 WHEN 70 : PROCreadpattern(2)
30 REM An easy two colour MODE Ø full screen sprite maker with pattern fills	1040 DIM sprite% dim% 1050 DIM place% 18796	2060 SYS "Wimp_Poll", mask%, block% TO re ason%	3080 WHEN 71 : PROCreadpattern(3)
40 REM for Archimedes only	1060 !sprite%=dim%	2070 PROCaction(reason%)	3090 WHEN 72 : PROCreadpattern(4) 3100 WHEN 73 : PROCsetdesign
50 REM By Ian Wilson (c) 60 :	1070 sprite%!4=0 1080 sprite%!8=16	2080 ENDPROC 2090 :	3110 ENDCASE 3120 ENDCASE
70 ON ERROR PROCerror 80 PROCeetup	1090 sprite%!12=16 1100 SYS "OS_SpriteOp",256+10,sprite%,f	2100 DEF PROCaction(reason%) 2110 IF waiting_for_ac% AND reason%<>17	3130 WHEN 1 : CASE hnd% OF 3140 WHEN main% : IF ready_for_text%=0
90 PROCmain 100 PROCfinish	ile\$ 111Ø ENDPROC	AND reason%<>18 THEN 2120 waiting_for_ac%=FALSE	THEN xe%=mx% : ye%=my% : PROCrubber 3150 ENDCASE
110 END 120 :	1120 : 1130 DEF PROCmake_patterns	2130 saving%=FALSE 2140 PROCstoppit	3160 ENDCASE 3170 ENDPROC
130 DEF PROCEetup	1140 DIM byte%(8)	2150 ENDIF	3180 :
140 alias\$=" <doodle\$dir>" 150 version\$="3.2"</doodle\$dir>	1150 DIM pat%(5) 1160 in%=OPENIN " <doodle\$dir>.Patterns"</doodle\$dir>	2160 CASE reason% OF 2170 WHEN 0 :	3190 DEF PROCcreate_menu(title\$,x%,y%) 3200 menuy%=y%
160 font\$="" 170 DIM q% 1200, r% 1200, block% 1200,	1170 DIM patterns% 2000 1180 !patterns%=2000	2180 IF FNbutton>0 AND doing% AND NOT s aving% AND hndl%<>checker% AND hndl%<>sa	3210 PROCbuild_menu(title\$,menuy%) 3220 menux%=x%-64
menblk% 1200,useful% 100 180 DIM main blk% 1200	1190 patterns%!4=0 1200 patterns%!8=16	ver% THEN 2190 PROCstoppit	3230 menuy%=y% 3240 SYS "Wimp_CreateMenu",,blk%,menux%
190 DIM patblk% 1200	1210 patterns%!12=16 1220 FOR i%=0 TO 4	2200 ENDIF 2210 CASE FNbutton OF	,menuy%
200 DIM fonts% 2600 :\$fonts%=CHR\$(0) 210 DIM fontget% 120	1230 \$pointer%="pat_"+STR\$(i%)	2220 WHEN 0 : IF rubber% THEN PROCpenci	3250 ENDPROC 3260 :
220 DIM test% 20 230 DIM pointer% 40	1240 SYS "OS_SpriteOp",256+15,patterns%,pointer%,0,57,20,0	1 ELSE IF pencil% THEN PROCdraw(4) 2230 drawing%=FALSE	3270 DEF PROCCreate_icon_menu(title\$,x%)
240 DIM box% 16, box2% 16, matrix% 16, origin% 8,blank% 16,old% 16	1250 SYS "OS_SpriteOp",256+60,patterns%,pointer%,0 TO naught%,one%,two%,three%	2240 WHEN 1 : IF rubber% THEN PROCdraw(0)	3280 menuy%=0 3290 PROCbuild_menu(title\$,menuy%)
250 DIM row%(8), rowd%(8) 260 rubber%=FALSE : pencil%=FALSE	1260 VDU 23,17,4,1 1270 IF i% THEN	2250 WHEN 4 : IF pencil% THEN PROCdraw(3300 menux%=x%-64 3310 SYS "Wimp_CreateMenu",,blk%,menux%
270 ready_for_text%=0	1280 FOR j%=1 TO 8	2260 ENDCASE	,menuy%
280 \$q%="TASK" 290 SYS "Wimp_Initialise",200,!q%,"Doo	1290 byte%(j%)=BGET# in% 1300 NEXT	2270 WHEN 1 : PROCupdate 2280 WHEN 2 : PROCopen	3320 ENDPROC 3330 :
dle" TO ,handle% 300 PROCsprites(alias\$+".!Sprites")	1310 VDU 23, i%+1, byte%(1), byte%(2), byte %(3), byte%(4), byte%(5), byte%(6), byte%(7)	2290 WHEN 3 : PROCdraw(4) : PROCclose 2300 WHEN 4 : IF !block%=main% THEN PRO	3340 DEF PROCEduild_menu(title\$, RETURN h eight%)
310 iconh%=FNiconbar("!Doodle") 320 info%=FNtemplates(alias\$+".Templat	,byte%(8) 1320 GCOL i%*16,0	Carrow 2310 WHEN 5 : IF !block%=main% THEN	3350 LOCAL offset%,i%,menuItems%,dots%, wimpflags,flags,ptr%,name\$,ptr\$
es") 330 PROCset_version(version\$)	1330 BLSE 1340 GCOL 1	2320 IF ready_for_text%=0 THEN PROCpenc il ELSE PROCpen	3360 offset%=FNfind_menu(title\$,menu_da ta%)
340 PROCmake_patterns	1350 ENDIF	233Ø ENDIF	3370 IF offset%=TRUE THEN ERROR 42,"Can 't find menu data"
350 PROCget_fonts 360 PROCload_menus	1360 FILL 10,10 1370 PRINTTAB(0,0) STR\$(i%)	2340 WHEN 6 : PROCcheck_mouse(!block%,b lock%!4,block%!8,block%!12,block%!16)	338Ø blk\$=FNget_menu_item(menu_data%,of
370 PROCmake_doodle 380 x%=0 : y%=0	1380 SYS "OS_SpriteOp",naught%,one%,two %,three%	2350 WHEN 7 : IF dragging% THEN 2360 bin%=FNbutton	fset%) 3390 blk%=EVAL(blk\$)
390 doing%=0 : saving%=FALSE : draggin g%=FALSE : scrap%=FALSE	1390 !q%=ecfs% 1400 q%!4=0	2370 IF hndl%=main% THEN xe%=0 : ye%=0 : PROCdraw(141) : dragging%=FALSE	3400 \$blk%=LEFT\$(title\$,12) 3410 blk%?12=7
400 waiting_for_ac%=FALSE 410 drawing%=PALSE	1410 q%:8=-80*(i%+1) 1420 q%:12=128	2380 ENDIF 2390 IF saving% THEN PROCSEND_save_mesg	3420 blk%?13=2 3430 blk%?14=7
420 sent%=4	1430 q%!16=-80*i%	2400 WHEN 8 : IF ready_for_text%=2 AND block%=main% THEN PROCcheckchar	3440 blk%?15=0 3450 blk%!16=172
430 on%=%0 440 off%=%1	1440 q%:20=£2106 1450 DIM q%:24 5	2410 WHEN 9 : item%=block%!4 : PROCmenu	3460 blk%!20=44
450 open%=FALSE 460 scrapname\$="doodle"	1460 \$(q%!24)="pat_"+STR\$(i%) 1470 q%!28=patterns%	_select 2420 WHEN 17,18 : PROCmessage	3470 blk%!24=0 3480 i%=28
470 ENDPROC 480 :	1480 q%!32=5 1490 SYS "Wimp_CreateIcon",,q% TO pat%(2430 ENDCASE 2440 ENDPROC	3490 menuItems%=0 3500 dots%=0
490 DEFPROCget_fonts 500 offset%=0	1%) 1500 NEXT	2450 :	3510 WHILE menu_data%?offset%<>ASC"" A ND menu_data%?offset%<>ASC"""
510 REPEAT 520 !fontget%=0	1510 CLOSE# in% 1520 REM PROCreadpattern(1)	2460 DEFPROCCheckchar 2470 char%=block%:24 2480 CASE char% OF	3520 PROCmenu_item 3530 IF RIGHT\$(name\$,1)="@" THEN name\$=
530 SYS "OS_GBPB",9," <doodle\$dir>.BBCF</doodle\$dir>	1530 ENDPROC	2490 WHEN 13 : 2500 ready_for_text%=0	LEFT\$ (name\$, LENname\$-1): ptr\$=FNbuild_eu bmenu(name\$,pos%)
onts",fontget%,1,offset%,12,"" TO ,,,rea d%,offset%	1540 : 1550 DEF PROCmake_doodle	2510 bin%=FNbutton	3540 IF (flags AND 4)=4 THEN
540 test\$=\$fontget% 550 REM WHILE ASC(test\$)<33	1560 !place%=18796 1570 place%!4=0	2520 IF hnd1%=main% THEN PROCpencil 2530 SYS "Wimp_SetCaretPosition",-1	3550 instr%=INSTR(ptr\$,",") 3560 blk%!(i%+12)=EVAL(LEFT\$(ptr\$,instr
560 REM test\$=RIGHT\$(test\$,(LEN(test\$) -1))	1580 place%!8=16 1590 place%!12=16	2540 WHEN 127 2550 PROCdraw(10)	%-1)) 3570 ptr\$=MID\$(ptr\$,instr%+1)
570 REM ENDWHILE 580 IF ?fontget% THEN font\$=font\$+LEFT	1600 \$pointer%="doodle" 1610 SYS "OS_SpriteOp",256+15,place%,po	2560 ex%-=16 : x%-=16	3580 instr%=INSTR(ptr\$,",") 3590 blk%!(i%+16)=EVAL(LEFT\$(ptr\$,instr
\$(test\$,(INSTR(test\$,CHR\$(0))-1))+".\fin d font."	inter%,1,618,234,0 1620 PROCsort doodle	2580 WHEN 396 2590 ex%-=2 : x%-=2	%-1)) 3600 ptr\$=MID\$(ptr\$,instr%+1)
590 UNTIL offset%=-1	1630 PROCset_savename("DOODLE")	2600 PROCESTCATE 2610 WHEN 397	3610 blk%!(i%+20)=EVAL(ptr\$) 3620 wimpflags=wimpflags OR 2°8
600 ENDPROC 610 :	1640 ENDPROC 1650 :	2620 ex%+=2 : x%+=2	3630 ptr%=-1
620 DEF PROCload_menus 630 lm%=OPENIN(alias\$+".Menu")	1660 DEF PROCload_doodle 1670 !place%=18796	2630 PROCsetcaret 2640 WHEN 398	3640 \$(blk%!(i%+12))=LEFT\$(name\$,blk%!(i%+20))
640 menu_offset%=EXT#1m% 650 dim%=menu_offset%+LEN(font\$)+64	1680 place%!4=0 1690 place%!8=16	2640 WHEN 398 2650 why%-=4 : y%-=4 2660 PROCsetcaret	3650 ELSE 3660 \$(blk%+i%+12)=LEFT\$(name\$,12)
660 CLOSE#1m% 670 DIM menu data% dim%	1700 place%!12=16 1710 SYS "OS_SpriteOp",10+256,place%,lo	2670 WHEN 399	3670 ptr%=EVAL(ptr\$) 3680 ENDIF
680 OSCLI "LOAD "+alias\$+".Menu "+STR\$	adname\$ 1720 PROCsort_doodle	2680 why%+=4 : y%+=4 2690 PROCsetcaret 2710 OTHERWISE	3690 blk%!i%=flags 3700 blk%!(i%+4)=ptr%
(menu_data%) 690	1730 IF INSTR(loadname\$, " <wimp\$scrap>")</wimp\$scrap>	2720 IF char%<32 OR char%>255 THEN	3710 blk%!(i%+8)=wimpflags
700 \$(menu_data%+menu_offset%)="^Text" +CHR\$(10)+"fonts%"+CHR\$(10)+"System"+CHR	<1 THEN PROCSet_savename(loadname\$) ELSE PROCSet_savename(scrapname\$)	2730 SYS "Wimp_ProcessKey", char% 2740 ELSE	3720 1%=1%+24 3730 menuItems%+=1
\$(10)+"\system_font"+CHR\$(10) 710 FOR i%=1 TO LEN(font\$)	1740 IF scrap% THEN 1750 *REMOVE «Wimp\$Scrap» 1760 scrap%=FALSE	2750 PROCdraw(10) 2760 ex*+=16 : x*+=16	3740 ENDWHILE 3750 height%=96+(menuItems%*44)+(dots%*
720 i\$=MID\$(font\$,i%,1) 730 IF i\$="." THEN i\$=CHR\$(10)	1760 scrap%=FALSE 1770 ENDIF	2770 PROCsetcaret 2780 ENDIF	24) 3760 current_menu\$=LEFT\$(\$blk%,12)
740 \$ (menu_data%+menu_offset%+32+i%)=i \$	178Ø ENDPROC	2790 ENDCASE	377Ø ENDPROC 378Ø :
750 NEXT	1900 DEF PROCSORT_doodle 1810 SYS "Hourglass_On"	2810 : 2810 : 2820 DPP DPCCaback mouse/mys must but h	3790 DEF PROCmenu_item 3800 wimpflags=&7000021
760 \$(menu_data%+menu_offset%+33+LEN(f ont\$))="""	1820 SYS "OS_SpriteOp", 256+62, place%, "d	nd%,1con%)	3810 flags=0
770 current_menu\$="" 780 ENDPROC	oodle",0 TO ,,,size 1830 DIM sarea size	2830 CASE but% OF 2840 WHEN 2 : IF hnd%=-2 THEN	3820 ptr\$="-1" 3830 func\$=""

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```
5730 x%=!q%
5740 y%=q%14
5750 hnd1%=q%112
5760 =q%18
5770:
5780 DEF PROCdraw(code%)
5790 IF code%<>4 THEN safe%=FALSE
5800 REM *** code%=0 -- erasing (
printing space character and deleting)
5810 REM *** code%=4 -- moving pointer
                                                                                                                                                                                     4670:
4680 DEF PROCFinish
4690 SYS "Wimp_CloseDown", handle%, !q%
4700 END
4710 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      6670 SYS "Wimp_PlotIcon",,r%
6680 SYS "Wimp_GetRectangle",,q% TO mor
3840 name$=FNget_menu_item(menu_data%,o
ffset%)
3850 IF menu_data%?offset%=ASC"!" offse
t%+=1:ptr%=FNget_menu_item(menu_data%,offset%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   6690 SYS "Wimp_GetRectanges"
6690 ENDWHILE
6700 ENDPROC
6710 :
6720 DEF PROCget_pattern
 fset*)
3860 IF menu_data%?offset%=ASC"(" offse
t%=1:wimpflags=EVAL(FNget_menu_item(men
u_data%.offset%))
3870 IF menu_data%?offset%=ASC"\" offse
                                                                                                                                                                                      4720
                                                                                                                                                                                      4730 DEF PROCERTOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      6730 17%=0
6740 875 "Wimp_GetPointerInfo",,1%
6750 FOR 1%=0 TO 4
6760 IF 7%116=pat%(1%) THEN pattern%=1%
6770 NEXT
                                                                                                                                                                                      4740 SYS "Wimp_DragBox",,0
4750 !block%=ERR
                                                                                                                                                                                  4750 PIOCEX=ERR
4750 PIOCETRUE
4770 CASE ERR OF
4750 WHEN 222 : $(block%+4)="This file
does not exist"+CHR$(0):error=FALSE
4750 WHEN 57757 : $(block%+4)="Mo disc?
Then no font"+CHR$(0):error=FALSE
4850 OTHERWISE
    t%+=1:func$=FNget_menu_item(menu_data%,o
  t%+=1:runcy=rwget_menu_tem menu_data*,offset%)
3880 IF menu_data*?offset%=ASC"" OR me
nu_data*?offset%=ASC"" flags=flags OR &
80
                                                                                                                                                                                                                                                                                                                                                                                                                          *** code%=5 -- drawing
*** code%=9 -- moving ca
                                                                                                                                                                                                                                                                                                                                                                      5820 REM
5830 REM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     6770 NEXT
6780 1 (%=0
6790 (%14=5
6800 (%18=x*10-20
6810 (%12=x*14-20
6820 (%116=x*10+20
6830 (%120=x*14+20
6840 (%124=0
6850 (%128=0
6850 (%128=0
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6850 (%128=0
6
   80
3890 IF LEFT$ (name$,1)=")" THEN flags+=
1:name$=MID$ (name$,2)
3900 IF LEFT$ (name$,1)="8" THEN flags+=
4:name$=MID$ (name$,2)
3910 IF RIGHT$ (name$,1)=")" THEN flags+=
2:name$=LEFT$ (name$,LENname$-1):dote%+=
                                                                                                                                                                                                                                                                                                                                                                     5840 REM
                                                                                                                                                                                                                                                                                                                                                                                                                          *** code%=10 - text comi
                                                                                                                                                                                    4800 OTHERWISE
4810 $(block*4)="(internal error code
**STR$(ERI,*") **REPORT$+"("+STR$(ERR)+"
"*CHR$(0)
4820 ENDCASE
4830 flags=1
4840 SYS "Wimp_ReportError",block%,flag
s,"Doodle"
4850 IF error THEN PROCfinish ELSE PROC
                                                                                                                                                                                                                                                                                                                                                                   ng
5850 REM
                                                                                                                                                                                                                                                                                                                                                                                                                          *** code%=141 - pattern f
                                                                                                                                                                                                                                                                                                                                                                 5850 REM *** code%=141 - pattern f
ill
5860 lq%=main%
5870 SYS "Wimp_GetWindowState",,q%
5880 xoffset%=q%14-q%120
5890 yoffset%=q%16-q%124-936
5900 $pointer%=rdoodle"
5910 SYS "0S_SpriteOp",60%100,place%,pointer%,sarea TO naught%,one%,two%,three
      392Ø ENDPROC
      3930 :
3940 DEF FNbuild_submenu(title$,pos$)
3950 LOCAL blk$,blk$
3960 PROChuild_menu(title$,pos$)
3970 =blk$
                                                                                                                                                                                   main: END
4860 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                   %
5920 IF code%<>10 THEN ex%=x%-xoffset%
: why%=y%-yoffset% : nye%=ye%-yoffset% :
nxe%=xe%-xoffset%
                                                                                                                                                                                        4870
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        6920 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        6930 DEF FNshow_patterns
6940 IF block%!4>0 THEN =0
   3980 : 3980 DEF PROCmenu_select
4000 STS "Mimp_GetPointerInfo",,q%
4010 but%=q%18
4020 depth%=0
4030 FROCdecode_menu(current_menu$)
4040 IF (but% AND 1)=1 TREN
4050 FROCTe_openmenu(current_menu$,menu
%,menuy%)
4050 ELSE
4070 current_menu$=""
4050 ENDFROC
4050 ENDFROC
4050 ENDFROC
4050 ENDFROC
                                                                                                                                                                                        4880 DEF PROCtellemoff(q$)
                                                                                                                                                                                     4880 DBF PROCTellemoff(q$)
4890 Useful%=0
4990 $(useful%+4)=q$+CHR$(0)
4910 SYS "Wimp_ReportError",useful%,1,"
boodle"
4920 EMDPROC
4930 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      6940 IF block%14>0 THEN =0
6950 IF shock%14>0 THEN =0
6950 SYS "Wimp_GetWindowState",,q%
6970 Iq%=ecfs%
6970 q%162=0
7000 q%112=q%14-120
7000 q%124=0
7010 q%124=0
7010 q%124=0
7010 q%124=0
7010 g%124=0
7010 g%126=1
7040 SYS "Wimp_OpenWindow",,q%
7050 =0
7050 10 FF FNnew_doodle
7080 doing%=1
                                                                                                                                                                                                                                                                                                                                                                   nxe%=xxefset%
5930 CASE code% OF
5940 WHEN 0 : MOVE ex%+5, why%-5 : VDU 5
.11,127,32,10,4
5950 q%+main%
5960 q%+4ex%-30
5970 q%+8exhy%-30-936
5980 q%+12ex%+30
5990 q%+16exhy%+30-936
6000 SYS "OS_SpriteOp", naught%, one%, two
%, three%
6010 WHEN 9 : MOVE ex%, why%+30
6010 SYS "OS_SpriteOp", naught%, one%, two
%, three%
                                                                                                                                                                                      4930 :
4940 DEP PROCCreate_window
4950 lblock%-main%
4960 block%18-200
4970 block%18-200
4980 block%12-1042
4990 block%16-900
5000 block%120-198
5010 block%124-80
        4110 DEF PROCre_openmenu(title$,menx%,m
                                                                                                                                                                                        5010 block%!24=-80
                                                                                                                                                                                                                                                                                                                                                                    %, three%
                                                                                                                                                                                                                                                                                                                                                                       6030 PROCsetcaret
                                                                                                                                                                                                                                                                                                                                                                6030 PROCsetcaret
6040 MHEN 10: MOVE ex*+16, why%+30: VD
U 5,127: MOVE ex*, why%+30: VDU 5
6050 Puseful%=char%
6060 SYS "09 Mord",10, useful%
6070 IP BBCfont* THEN
6080 chart%=10*((char%)-32)
6090 FOR 1%=0 TO 9
6100 VDU fonts%?(char*+1%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7080 doing%=1
7090 IF safe% THEN
7100 PROCdoit
                                                                                                                                                                                        5020 block%!28=-1
                                                                                                                                                                                      5030 SYS "Wimp_OpenWindow",,block%
5040 open%=TRUE
5050 ENDPROC
        4120 offset%=FNfind_menu(title$,menu_da
        4130 blk%=EVAL(FNget_menu_item(menu_dat
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7110 RLSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7110 ELSE
7120 PROCcheck
7130 ENDIF
7140 =0
       %,offset%))
4140 SYS "Wimp_CreateMenu",,blk%,menx%,
                                                                                                                                                                                        5060
                                                                                                                                                                                      5960 :
5970 DEF PROCClose
5980 SYS "Wimp_CloseWindow",,block%
5990 !useful%=ecfc%
5100 SYS "Wimp_CloseWindow",,useful%
5110 open%=FALSE
5120 ENDPROC
   meny%
4150 current_menu$=title$
4160 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   7160 DEF PROCdelete
7170 Spointer%="doodle"
7180 SYS "05_SpriteOp",25+256,place%,pointer%
7190 ENDPROC
7200 :
7210 DEF PROCCheck
7220 VDU 7
7230 !G%=Checker%
7240 G%14600
7250 G%16=100
7260 G%112=1214
7270 G%16=304
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7160 DEF PROCdelete
                                                                                                                                                                                                                                                                                                                                                                        6110 NEXT
6120 ENDIF
        4170 :
4180 DEF PROCAdecode_menu(title$)
4190 LOCAL men_loop%,func$
4200 offset%=FNfind_menu(title$,menu_da
                                                                                                                                                                                                                                                                                                                                                                      6120 EMDIF

6130 VDU chark

6140 [q%=maink

6150 q%14=exk-30

6160 q%18=whyk-30-936

6170 q%112=exk-30

6180 q%16=whyk-40-936

6190 SYS "OS_SpriteOp", naught%, one%, two
, three%
                                                                                                                                                                                      5130 :
5140 DEP PROCOpen
5150 SYS "Wimp_OpenWindow",,block%
5160 ENDEROC
5170 :
5180 DEF FNget_menu_item(db%,RETURN off
  4210 blk%=EVAL(FNget_menu_item(menu_ak,offsetk))
4210 men_loop%=0
4210 men_loop%=0
4210 wHILE men_loop%c=block%|depth%
4240 dots%=0
4250 FROCmenu_item
4260 men_loop%=1
4270 ENDWHILE
4280 IF block%|depth%>-1 THEN
4290 IF RIGHT%|name%, 1]="0" THEN
4300 name%=LETT%|name%, LENname%-1)
4310 depth%=4
        4210 blk%=EVAL(FNget_menu_item(menu_dat
                                                                                                                                                                                     %)
5190 LOCAL st$
5200 WHILE db%?off%<>10 AND db%?off%<>1
                                                                                                                                                                                                                                                                                                                                                                  6179 818 08_9pittery ,musgint871,useful%?

6200 VDU 23,?useful%;useful%?1,useful%?

2,useful%?3,useful%?4,useful%?5,useful%?

6,useful%?7,useful%?8

6210 WHEN 141 : IF pattern% THEN GCOL p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7270 g%!16=304
                                                                                                                                                                                       5210 st$+=CHR$(db%?off%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7280 g%!20=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7280 q*:20=0
7290 q*:24=0
7300 q*:28=-1
7310 SYS "Wimp_OpenWindow",,q*
                                                                                                                                                                                        5220 off%+=1
5230 ENDWHILE
                                                                                                                                                                                                                                                                                                                                                                    attern%*16.0
                                                                                                                                                                                                                                                                                                                                                                       6220 FILLex%, why% :GCOL 0,1
                                                                                                                                                                                        5240 off%+=1
5250 =st$
                                                                                                                                                                                                                                                                                                                                                                   6220 FILLex*, why% :GCOL 0,1
6230 [q%=main*
6240 q%14-0
6250 q%18-356
6260 q%18-1236
6270 q%16-0
6280 SYS "0S_SpriteOp", naught%, one%, two
%, three%
6230 OTHERWISE
6330 FLOT code%, ex%, why%
6310 SYS "0S_SpriteOp", naught%, one%, two
%, three%
         4310 depth%+=4
         4320 PROCdecode menu(name$)
                                                                                                                                                                                        5260 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       7330 :
7340 DEFPROCYes
7350 !q%=saver%
7360 q%!4=700
7370 q%!8=100
7380 q%!12=1034
7390 q%!16=304
7400 q%!20=0
7410 q%!24=0
7420 q%!8=-1
                                                                                                                                                                                        5270 DEF FNfind_menu(name$,data%)
         4330 ENDIF
                                                                                                                                                                                      5270 DEF FNfind menu(name$,data$)
5290 LOCAL fi$
5290 name$=""+name$
5300 offset%=0
5310 REPEAT
5320 fi$=FNget_menu_item(data$,offset%)
5330 UNTL fi$=name$ OR fi$="""
5340 IF fi$="" THEN =TRUE
5350 offset%
5360 :
5370 DEP FNfin
        4340 IF func$<>"" THEN a=EVAL("FN"+func
  $)
4350 ENDIF
4360 ENDPROC
 4350 ENDIF

4360 ENDPROC

4370:
4380 DEF FNtemplates(file$)
4390 DIM Q% 2046, P% 2046, R% 2048, S% 2048, T% 2048 UN 3040
44100 Maxwa%+100

44100 Maxwa%+100

4410 DIM indir% maxwe%, indir2% maxwe%, indir3% maxwe%, indir3% maxwe%, indir3% maxwe%, indir3% maxwe%, indir3% maxwe%, indir6% maxwe%

4420 SYS "Mimp DoenTemplate", ,Q%, indir%, indir%+maxwe%, -1, "info",0

4430 SYS "Mimp LoadTemplate", ,P%, indir3%, indir3%+maxwe%, -1, "ims",0

4440 SYS "Mimp LoadTemplate", ,P%, indir3%, indir3%+maxwe%, -1, "aver",0

4450 SYS "Mimp LoadTemplate", ,T%, indir3%, indir3%+maxwe%, -1, "checker",0

4450 SYS "Mimp LoadTemplate", ,T%, indir5%, indir5%+maxwe%, -1, "design",0

4450 SYS "Mimp LoadTemplate", ,U%, indir6%+maxwe%, -1, "design",0
4490 SYS "Mimp CreateWindow", ,P% TO mai
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7420 q%!28=-1
7430 SYS "Wimp_OpenWindow",,q%
7440 SYS "Wimp_SetCaretPosition",saver%
                                                                                                                                                                                                                                                                                                                                                                    %, three%
                                                                                                                                                                                                                                                                                                                                                                    %,three%
6320 |q%=main%
6330 |F ex%<nxe% THEN q%!4=ex%-10 : q%!
12=nxe%+10 ELSE q%!4=nxe%-10 : q%!12=ex%
                                                                                                                                                                                        5360 :
5370 DEF FNfin
                                                                                                                                                                                       5380 doing%=2
5390 IF safe% THEN
5400 PROCdoit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1,,,-1,6
7450 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                   +10
6340 IF why%<nye% THEN q%!8=why%-946;
q%!16=nye%-926 ELSE q%!8=nye%-946; q%!1
6mkhy%-926
6350 ENDCASE
6360 IF code%<>10 THEN xe%=x%; ye%=y%
6380 SYS "Wimp_UpdateWindow", q% TO mor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7450 ENDPROC
7460:
7470 DEPPROCNO
7480 PROCADit
7490 ENDPROC
7500:
7510 DEPPROCADIT
7510 DEPPROCADIT
7510 REM doing%=1
quit
7530 REM doing%=2
quit
7540 REM doing%=3
10ad a doodle ***
7550 CASE doing% OF
7550 WHEN 1:
7570 PROCADLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7460
                                                                                                                                                                                        5410 ELSE
                                                                                                                                                                                        5420 PROCcheck
                                                                                                                                                                                        543Ø ENDIF
                                                                                                                                                                                        5440 =0
                                                                                                                                                                                  5450:
5460 DEF PROCPENCI
5470 $pointer%="ptr_pencil"
5480 SYS "OS_SpriteOp",36+8100,sprite%,
pointer%;2
5490 pencil%=TRUE: rubber%=FALSE
5500 ENPROC
5510:
5520 DEF PROCATROW
5530 $YS "Wimp_SpriteOp",36+8100,,point
er%,1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *** Waiting t
                                                                                                                                                                                                                                                                                                                                                                      %
6400 | Ir%=0
6410 | Ir%=0
6410 | Ir%=0
6410 | Ir%=0
6420 | Ir%=0
6420 | Ir%=0
6430 | Ir%=0
6440 | Ir%=0
6440 | Ir%=0
6440 | Ir%=0
6450 | Ir%=0
6450 | Ir%=0
6470 | Irw=0
647
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *** Waiting t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *** Waiting t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7570 PROCdelete
        4500 SYS "Wimp_CreateWindow",,P% TO mai
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7580 PROCmake_doodle
7590 IF NOT open% THEN PROCcreate_windo
                                                                                                                                                                                   er%,1
5550 rubber%=FALSE : pencil%=FALSE
5560 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                        6480 r%!28=7
                                                                                                                                                                                                                                                                                                                                                                      6490 SYS "Wimp_PlotIcon",,r%
6500 SYS "Wimp_GetRectangle",,q% TO mor
        4510 SYS "Wimp_CreateWindow",,R% TO sav
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       7600 PROCupdate
    er%
4520 SYS "Wimp_CreateWindow",,S% TO ecf
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7610 WHEN 2 :
7620 PROCfinish
                                                                                                                                                                                        5570 :
5580 DEF PROCrubber
                                                                                                                                                                                                                                                                                                                                                                       6510 ENDWHILE
       4530 SYS "Wimp_CreateWindow",,T% TO che
                                                                                                                                                                                                                                                                                                                                                                      6520 ENDPROC
6530 :
6540 DEF PROCupdate
                                                                                                                                                                                       5590 $pointer%="ptr_rubber"
5600 SYS "OS_SpriteOp",36+&100,sprite%,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7630 WHEN 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7640 IF FNinspect THEN
7650 PROCdelete
    cker%
4540 SYS "Wimp_CreateWindow",,U% TO des
                                                                                                                                                                                   pointer%, 2
                                                                                                                                                                                      5610 rubber%=TRUE : pencil%=FALSE
5620 ENDPROC
   ign%
4550 SYS "Wimp_CloseTemplate"
4560 =info%
                                                                                                                                                                                                                                                                                                                                                                       6550 1q%=main%
6560 SYS "Wimp_RedrawWindow",,q% TO mor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          660 PROCload doodle
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7670 IF NOT open% THEN PROCCreate_windo
                                                                                                                                                                                      5630 :
5640 DEF PROCpen
5650 Spointer%="ptr_pen"
5660 SYS "OS_SpriteOp",36+&100,sprite%,
                                                                                                                                                                                                                                                                                                                                                                    e%
6570 WHILE more%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       7680 PROCupdate
                                                                                                                                                                                                                                                                                                                                                                      6570 WHILE more%
6580 !r%=0
6590 r%!4=-936
6600 r%!8=1236
6610 r%!12=0
6620 r%!16=&2102
        4580 DEFPROCset_version(v$)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         769Ø ELSE
       4590 (q%=info%
4600 q%:4=7
4610 SYS "Wimp_GetIconState",,q%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7700 PROCtellemoff("This file is not a
                                                                                                                                                                                   pointer%,3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    doodle")
                                                                                                                                                                                        5670 rubber%=FALSE : pencil%=FALSE
        4620 q%!8=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7720 ENDCASE
      4630 q%|12=0
4640 $q%|28=v$+CHR$(0)
4650 SYS "Wimp_SetIconState",,q%
4660 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                        6630 $pointer%="doodle"
6640 r%!20=pointer%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          773Ø PROCstoppit
774Ø ENDPROC
                                                                                                                                                                                        5700 DEF FNbutton
                                                                                                                                                                                                                                                                                                                                                                       6650 r%!24=place%
6660 r%!28=7
                                                                                                                                                                                      5710 |q%=0
5720 SYS "Wimp_GetPointerInfo",,q%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7760 DEF PROCStoppit
```

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150	7880 WHEN 0 : PROCfinish	8830 :	9700 ENDIF	10600 DEFPROCselectpattern(pat%)
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1985 Section 1985	7900 WHEN 2 : PROCdosave(\$(block%+44))	8860 IF block%!36<>-1 THEN safe%=TRUE	9730 DEF PROCtransmit	10630 !g%=design%
130 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150 150		8870 SYS "OS_SpriteOp", 256+12, place%, sa vename\$+CHR\$(0)		10640 q%!4=i%
	7930 WHEN 5 : REM *** No data_open seq	8880 IF saving% THEN	9760 size%=block%!24 :z%=18	10660 IF i%=pat% THEN \$q%!28="radioon" I
198 March 1 - 188 *** Importing a book 1910 (rice team) (plant) 1910 (rice team) (pla			9770 ELSE	LSE \$q%!28="radiooff"
100 100 11 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	7950 WHEN 7 : REM *** Importing a dood	8910 q%!24=twentyfour%	9790 ENDIF	10680 q%!12=13
1989 Description 1990	7960 WHEN 8 : IF NOT safe% THEN		9800 IF size%<0 THEN size%=0	
100	7970 block%!12=block%!8	8940 q%!12=your_ref%	hunk%, block%!4, block%!20, size%	
100		8950 q%136=0 8960 q%140=&ff9		10720 :
1988 Property 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 1989 198	8000 ENDIF	8970 \$(q%+44)=savename\$+CHR\$(0)		10740 LOCAL i%, j%
			9850 block%!24=size%	10750 SYS "Hourglass_On"
100	8030 :	9000 saving%=FALSE	lock%!4	
1000 1000-101 1000 1000-101 1000 1000-101 1000 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 1000-101 100	8050 doing%=3		9870 IF z%=17 THEN sent%=4 : SYS "Wimp_	10780 rowd%(i%)=0
100 17 clock 100 17 clock 100 17 clock 100 clock	8060 loadname\$=f\$	THEN PROCset_savename(savename\$)		10790 FOR j%=0 TO 7 10800 IF FNpix(i%-1,j%) THEN row%(i%)+=:
1989 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980 1980		9030 IF doing% AND safe% THEN PROCdoit	9890 :	^j% : rowd%(i%)+=2^(7-j%)
1.00 DOC-Cock 1.00 DOC	8090 ELSE	9050 *REMOVE <wimp\$scrap></wimp\$scrap>	9910 ready_for_text%=1	
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1310 OFF PROCESSION AND ADDRESS OF PROCESSION AND ADDRESS OF PROCESS OF PRO		9090 ENDPROC	9950 :	10850 SYS "OS_SpriteOp", 256+60, patterns
150 Character 150 Char	8150 LOCAL x%, y%, z%	9110 DEF PROCquick_save		,pointer%,Ø TO naught%,one%,two%,three%
100	8160 !q%=saver%	9120 LOCAL f%	998Ø font%=block%!4	10870 VDU 23, pediting%+1, row%(1), row%(2)
1309 Provided 1310 Provided Provided 1310 Provided 1310 Provided 1310 Provided	818Ø x%=q%!4			,row%(3),row%(4),row%(5),row%(6),row%(7)
13.00			10010 IF i%>0 THEN	10880 GCOL pediting%*16,0
\$1.00 PT INSTITUTE INSTI	821Ø q%!4=Ø	9170 savename\$=\$f%		
# \$40 GYM-16-5 # \$20 GYM-16-5		9180 IF INSTR(savename\$,".")<1 AND INST	10030 ENDIF	10910 SYS "OS_SpriteOp", naught%, one%, two
### 100 no 10 d Treatry window*			10040 NEXT 10050 fontnameS=LEFTS(fontnameS.INSTR(fo	
200 qt146-xxx		ave icon to a directory window")	ntname\$, "\")-2)	10930 SYS "OS_SpriteOp", 256+60, place%, po
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1900 qt1/18-06	828Ø q%!2Ø+=y%+z%	9220 PROCdosave(savename\$)	nts."+fontname\$+" "+STR\$"(fonts%)	2),rowd%(3),rowd%(4),rowd%(5),rowd%(6),r
1009 invorming path				
1318 q/144-0		9250 :	10090 in%=OPENIN path\$	%, three%
10.12		9260 DEF PROCget_transfer 9270 scrappameS=S(block%+44)		
10.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	8340 q%!44=0	928Ø !q%=64	10120 vdu%=BGET# in%	
1015 570 ***Imp. Desirons.Tate**, rg** 1015 570 ***Top. Desirons.Tate**, rg** 1015 570 ***Top		9300 q%18=0 9300 q%18=0		
1939 07 **Hisp_DragBox*, ., ., .,	8370 saving%=TRUE	9310 q%!12=your_ref%	10150 fonts%?chart%=vdu%	11010 SYS "Wimp_SetIconState",,q%
100 BDPPCC 3340 GV124=blockV124 10380 bPre4bSCPE Int 1040 BDPPCC 11660 DPFPCCC 11640 DPFPCCCC 11				11020 SYS "Hourglass_Off"
### 1978 OF PROCESS AND PROCES	8400 ENDPROC	9340 q%!24=block%!24	10180 byte%=BGET# in%	11040 ENDPROC
\$40 ST **Himp_GetPointerInfor, rd*				11050 : 11060 DEFENDITION ***
## ## ## ## ## ## ## ## ## ## ## ## ##	8430 SYS "Wimp_GetPointerInfo",,q%	937Ø q%!36=-1	10210 UNTIL EOF# in%	11070 LOCAL i%
### 946 Grid-12 twenty-four-equit 9400 STS "Mimp_SendMessage", 18, q4, block 1045 BECCENTERUE 10260				
### 1110 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1 18-1	8460 q%!24=q%!16 :twentyfour%=q%!24	9400 SYS "Wimp_SendMessage", 18, q%, block	10240 ready_for_text%=1	<21,1<<21
### 1120 EMPROC				
## 1308 CP 10-1879 943 10-1879 943 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 10-1879 1	8490 q%!12=0	9420 ENDPROC	10270 :	11120 UNTIL q%?i%=y%*8+x% OR q%?i%>64
1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116				11130 IF q%!i%=y%*8+x% THEN =TRUE ELSE =
1330 124-50 3440 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470 3470	8520 \$(q%+44)=FNget_savename	9450 PROCdump	-1,ex%,why%-936,40	11140 :
## S550 witing_for_act=TRUE			10300 ready_for_text%=2	11150 DEFFNsave_patterns
## ## ## ## ## ## ## ## ## ## ## ## ##	q%!24	9480 DEF PROCdump	10320 :	
## S50 DEF FNot savename 15 "05. Byte" (2.91.) 0 : PROCE LEROR (SRED ## S50 DEF FNot savename 15 "05. Byte" (2.91.) 0 : PROCE LEROR (SRED ## S50 DEF FNot savename 15 "05. Byte" (2.91.) 0 : PROCE LEROR (SRED ## S50 DEF FNot savename 10 1360 FNOt savename 10 1360 FNOt savename 10 1360 FNOt savename 10 1376 FNOT savename 10 140 FNOT savename 1120 FNOT savename 11				
### 1286 DEF PRiget_avername ### 9590 LOCAL ft ### 875 SSY # Worlplase Off STS SOS Sprite ### 9590 LOCAL ft ### 875 SSY SSY SOS Sprite ### 9590 LOCAL ft ### 875 SSY	8570 :	9510 ON ERROR LOCAL : RESTORE ERROR : S	10350 LOCAL i%, j%	
11220 SYS '05 SpriteOp", 25641, patt 11220 SYS '05 SpriteOp", 25641, patt 2576 SpriteOp",		YS "OS_Byte", 229, 1,0 :PROCtellemoff(REPO	10360 PROCselectpattern(p%+68)	11200 map%=0
S520 SYS "Winp GetConState", rk S520 Spointer%="doodle**CHE\$(8) 10390 FOR 3%=0 TO 7 10390 FOR 3%=0 TO	8600 !r%=saver%	Op", naught%, one%, two%, three% : ENDPROC	10380 FOR i%=7 TO 0 STEP -1	11210 FOR j%=0 TO 7 11220 SYS "OS_SpriteOp", 256+41, patterns%
1246 NEXT		9520 \$pointer%="doodle"+CHR\$(0)	10390 FOR j%=0 TO 7	,pointer%,j%,i% TO,,,,colour%
10410 If colour% THEN PROCectpix ((7-1%)*	8630 f%=r%!28		,pointer%,j%,i% TO,,,,,colour%	
### 1	8640 savename\$=\$f%	*	10410 IF colour% THEN PROCSetpix((7-i%)*	11250 BPUT# out%, map%
11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 11280 1128	8660 savename\$=MID\$(savename\$,INSTR(sav	9550 *HARDCOPYFX 1 1 1 40 1		
### ### ### ### ### ### ### ### ### ##	name\$,":")+1)	9560 SYS "Hourglass_Off"	10430 NEXT	11280 CLOSE# out%
## ## ## ## ## ## ## ## ## ## ## ## ##	8680 WHILE INSTR(savename\$,".")>0			
######################################	8690 savename\$=MID\$(savename\$, INSTR(sav	958Ø RESTORE ERROR	10460 DEFPROCsetpix(pix%, colour%)	11310 DEFFNsave
Listing 1 110 LINE 0,256,1280,256 120 PRINTTAB(0,0); "Population levels", 220 REM draw plot of population levels 120 REM Syerhulet (Ly1) 20 REM by Michael Attenburgh 30 REM for Arc only 40 REM (C) RAU Feb 92 50 : 510 PRINTTAB(0,1); "r=", LEFT\$(STR\$(r),5 50 : 517 C	8700 ENDWHILE	9590 SIS "OS_Byte",229,1,0 9600 ENDPROC	10470 !q%=design%	
Listing 1 110 LINE 0,256,1280,256 120 PRINTTAB(0,0),"Population levels", 78B(0,16);"If "Japunov exponent" 120 REM Syerhulst (Ly1) 120 REM by Michael Attenburgh 120 REM for Arc only 120 REM for Arc only 130 REM for Arc only 150 r=x**1,2/1280+2.8 160 PRINTTAB(0,16);"r=",LEFT\$(STR\$(r),5 170 REM do S00 iterations to allow x to 290 FOR T%=1 TO 500 100 REM for Arc only 150 r=x**1,2/1280+2.8 260 NEXT 220 REM draw plot of population levels 230 L=L/(500*LN(2)) 340 PLOT 69,x%,L*128+256 350 NEXT 360 ON Listing 2 Listing 2 100 REM for Arc only 40 REM (C) BAU Feb 92 50 : 40 REM for Rem (C) BAU Feb 92 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 : 50 :	871Ø =Bavename\$+CHR\$(Ø)			
120 PRINTTAB(0,0);"Population levels	intina 1	110 LINE 0,256,1280,256	210 NEXT	
TAB(6),16);" yapunov exponent" 230 FOR T%=1 TO 100 350 NEXT 350 ON	disting i	120 PRINTTAB(0,0); "Population levels",	220 REM draw plot of population levels	340 PLOT 69,x%,L*128+256
28 REM by Michael Attenburgh 30 REM for Arc only 150 r=x**1.2/1280#.2.8 250 PLOT 69, x*, x*512+512 260 MEXT 270 REM draw graph of Lyapunov exponen 50: 50 : 50 : 50 PRINTITAB(0.1); "" 50 MODE 12 170 REM do 500 iterations to allow x t 60 MODE 12 170 REM do 500 iterations to allow x t 60 FF 60 Stabilise 60 : 180 x=0.5	10 REM >Verhulst (Ly1)			350 NEXT
## ARM (C) BAU Feb 92	20 REM by Michael Attenburgh	140 FOR x%=0 TO 1279 STEP 2	250 PLOT 69,x%,x*512+512	
50:);" " t				msting 2
60 MODE 12 170 REM do 500 iterations to allow x t 280 L=0 20 REM By Michael Attenborough 70 OFF o stabilise 290 FOR I*=1 TO 500 30 REM for Archimedes only 80: 180 x=0.5 300 x=r*x*(1-x) 40 REM (C) BAU Feb 92 90 GCOL 1 190 FOR I*=1 TO 500 310 L+=LM(ABS(r-2*r*x)) 50:	50 :);" "		10 REM >Lyapunov set generator (Ly2)
80: 180 x=0.5 300 x=r*x*(1-x) 40 REM (C) BAU Feb 92 90 GCOL 1 190 FOR I%=1 TO 500 310 L+=LN(ABS(r-2*r*x)) 50:	70 OFF		280 L=0 290 FOR I%=1 TO 500	20 REM By Michael Attenborough
	80 :	180 x=0.5	300 x=r*x*(1-x)	40 REM (C) BAU Feb 92
100 LINE 0,512,1280,512 200 x=r*x*(1-x) 320 NEXT 60 REM initial values:				



```
2510 LDR link, linkS
2520 MOVS pc, link
            70 ser$="bbbbbbaaaaaa":side=.55:amin=
                                                                                                                                                                                   940 ?timblk%=3:SYS "OS_Word",14,timblk
3.082:bmin=3.45
80 Q%=500:REM iterations on first att
                                                                                                                                                                                  950 st1%=!timblk% AND &FFFFFF
960 sth%=timblk%!3 AND &FFFFF
970 TIME=0
980 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2530 :
2540 .more
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2530 :
2540 .more
2550 STR sp.stackS
2550 STR lnk,linkS
2570 LDR log,logarpos
2580 ADR v,seq
2590 ADR v,seq
2590 ADR v,seq
2590 ADR v,seq
2600 LDR i,isto:LDR x,xsto
2610 LDR t,tsto
2610 LDR t,tsto
2620 LDR depth,moreits
2630 B lloop
2640 :
2650 .stackS EQUD 0
2650 .linkS EQUD 0
2670 .xsto EQUD 0
2690 .r2 EQUD 0
2690 .r2 EQUD 0
2790 .isto EQUD 0
2710 .tsto EQUD 0
2710 .tsto EQUD 0
2710 .logarpos EQUD logar
2730 .its EQUD Q%
2740 .moreits EQUD Q%*3
2756 .xstart EQUD Xinit*(1<<28)
2766 .seq EQUS STRING$(255,CHR$0)
2770 EQUD 0
2780 ]
2790 NEXT
empt
90 Xinit=.5
100 fast%=FALSE
          110 :
120 PROCinit
                                                                                                                                                                                    99Ø
                                                                                                                                                                                 1000 DEF PROCEtatus(P)
         130 REM start of main loop: need to us
GOTOs because Escape is used to halt p
                                                                                                                                                                                1010 CLS
1020 PRINTTAB(0,0)"Settings——"
1030 PRINTTAB(0,3)"Min a"''"Min b"''"
       Otting.
140:
150 IF key*<>83 THEN
160 MODE 13:0FF
170 *FX 200
180 ON ERROR GOTO 360
180 ON ERROR GOTO 360
190 PROCGrawpic
200 ENDIF
210:
220 CLS
230 *FX 200,1
240 ON ERROR GOTO 370
250 PROCZOOM
260 IF key*=83 THEN PROCSave
270 IF key*=82 THEN PROCSave
270 IF key*<69 THEN GOTO 150
290 :
 lotting.
                                                                                                                                                                                 1040 PRINTTAB(0,4); amin, TAB(0,7); bmin, T
                                                                                                                                                                            AB(0,10); side''
1050 PRINT"Sequence"; ser$
1060 IF P=0 THEN ENDPROC
                                                                                                                                                                            1078 LOCAL 0%
1080 0%=TIME/P
1090 !timblk%=stl%+(0% AND &PFFFFF)
1100 timblk%:3=sth%+(0%>>24)+timblk%?3
1110 SYS "0S ConvertDateAndrime",timblk
%,stri%,255,"%1212*ml%am" TO ,0%
1120 70%=13
1130 PRINT'"Finish:"'$stri%
1140 ENDPROC
1150:
1150:
1160 DEF PROCXCOM
1170 PRINTTAB(0,0)"New Vals——"
1180 PRINTTAB(0,0)"New Vals——"
1180 PRINTTAB(0,0)"New Vals——"
1180 PRINTTAB(0,0)"New Vals——"
                                                                                                                                                                                  1070 LOCAL 0%
                                                                                                                                                                                                                                                                                                                                                             1830 DEF PROCcol(1)
                                                                                                                                                                                                                                                                                                                                                            1840 IF !xsto<0 THEN GCOL 2 TINT 0:ENDP
                                                                                                                                                                                                                                                                                                                                                             1850 LOCAL C%
                                                                                                                                                                                                                                                                                                                                                       1850 LOCAL C%
1860 C%=ABS(1)+RND(1)
1870 IF C%=15 THEN C%=15 ELSE IF C%<0 T
HEN C%=0
1880 C%=C%(15-C%)
1890 IF 1>=0 THEN C%=C% AND %111100000 E
LEE C%=C% AND %11001111
1990 GOLD (C% AND 63) TINT C%
1910 ENDPROC
1920:
1930 DEF PROCASSEM(fast%)
1940 FOR pass%=0 TO 2 STEP 2
1950 x=0
           300 REM end of main loop
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2780 ]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2790 NEXT
2800 ENDPROC
          310 @%=&9ØA
320 CLS
                                                                                                                                                                             Size"
1190 PRINT''"Select - shrink"'"Adjust
- enlargeMenu -"'" start"
1200 PRINT'"F-Fast"''"R-Reset"'"S-Save
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2810 :
2820 DEF FNiter8
           340 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2820 DBF FNiter8
2830 [OPT pass%
2840 LDRB r, [v,i]
2850 LDR r, [rp,r]
2860 SUBS i,i #1
2870 MOVLT i,#s1%-1
2880 RSBS x1,x,#s10000000
2890 BMI abort
2900 FNmulti(x,x,x1)
2910 FNmulti(x,x,r)
          350 :
360 IF ERR=17 THEN 220
370 ON ERROR OFF
                                                                                                                                                                                  ""E-Exit"
1210 MOUSE RECTANGLE -1000,-1000,2000,2
           38Ø MODE Ø
                                                                                                                                                                              000
1220 MOUSE TO 0,0
           390 G%=&90A
400 REPORT:PRINT;" at line ";ERL
                                                                                                                                                                                  1230 GCOL 4,0
1240 X%=0:Y%=0:S%=1024
                                                                                                                                                                                                                                                                                                                                                               195Ø x=Ø
            410 END
                                                                                                                                                                                                                                                                                                                                                              1960 r=1
1970 x1=2
                                                                                                                                                                                  1250 RECTANGLE 0.0.5%-1
       420 :
430 DEP PROCINIT
440 OFF
450 DIM C% (15)
460 FOR C%=0 TO 15
470 A%=C% DIV 4
480 C% (C%) = 2A OR (A%<<2) OR (A%<<4) OR
(C% AND 3)<<6)
490 NEXT
580 :
                                                                                                                                                                                                                                                                                                                                                             1980 v=3
1990 i=4
2000 t=5
                                                                                                                                                                                  1260 *FX 21,1
1270 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2910 FNmulti(x,x,r)
                                                                                                                                                                              1270 REPEAT
1280 RECTANGLE %, Y%, S%-1
1290 PRINTAB(0,4); amin+%%*side/1024.7A
10,7); bmin+Y%*side/1024.7AB(0,10); side*
S%/1024
1330 MOUSE X%, Y%, B%
1310 key%=IMKBY(0)
1320 IF (B% AND 1) AND S%<2000 THEN S%+
=4
                                                                                                                                                                                                                                                                                                                                                          1990 1=4
2000 t=5
2010 log=6
2010 log=6
2010 depth=7
2010 rp=9
2040 sp=13
2050 link=14
2060 :
2070 P%=code%
2080 [OPT pass%
2080 .lyapuno.
2180 STR ap, stackS
2110 STR link,linkS
210 MOV (# #81%=1
2130 ADR v,seq
2140 ADR rp,rl
2150 LDR x,xstart
2160 MOV depth,#6600
2170 :
2180 .ploop
2190 FNiter8
2200 SUBS depth,dept
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2950 DEF FNmulti(result, num1, num2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2960 IF fast% THEN
2970 PROCmulti16(result,num1,num2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2960 IF fast% THEN
2970 PROCMULTI3(result,num1,num2)
2980 BLSE
2990 PROCMULTI32(result,num1,num2)
3080 ENDIF
3010 = ""
3020 :
3030 DEF PROCMULTI32(ResHigh,num1,num2)
3040 Ihs=10
3050 rhs=11
3060 work=12
3070 ResLow=13
3060 work=12
3070 ResLow=13
3080 sign=14
3090 (OPP pags%
3100 MOV lhs,num1
3110 MOV rhs,num2
3120 EOR sign,lhs,rhs
3130 TST Ins,#880000000
3140 RSBNE Ihs,lhs,#8
3150 TST rhs,#8800000000
3140 RSBNE rhs,rhs,lsR #410
3180 MOV work,lhs,LSR #410
3180 MOV work,lhs,LSR #410
3180 MOV ResHigh,rhs,LSR #410
3210 MUL ResLow,lhs,rhs
3220 MUL lhs,ResHigh,lhs
3230 MUL lhs,ResHigh,lhs
3240 MUL ResHigh,rhs,she
3250 ADDS ResHigh,ResHigh,#810000
370 ADDS ResHigh,ResHigh,#8100000
370 ADDS ResHigh,ResHigh,lhs,LSR#210
3280 ADD ResHigh,ResHigh,ResLow,LSR #28
3300 ]
3340 RNSPRCC
   490 NEXT
500:
510 PRINT"Making log table...";
520 LF=610000000/(0**4)
530 LF=LF/-LOG(.5/1024)
540 DIM logar 4095*4
550 FOR Cesi TO 4095:logar!(C**4)=LF*L
0G((C**.5)/1024):NEXT
560 DIM timblk% 8, stri% 256,code% 2048
570 F=64/(LF*0%)
570 F=64/(LF*0%)
                                                                                                                                                                                   4
1330 IF (B% AND 4) AND S%>200 THEN S%-=
                                                                                                                                                                               4
1340 RECTANGLE X%, Y%, S%-1
1350 UNTIL (B% AND 2) OR key%=70 OR key
%=82 OR key%=83 OR key%=87
1350 RECTANGLE X%, Y%, S%-1
1370 fast%=(key%=70)
1380 min+=X%*side/1024
1390 bmin+=X%*side/1024
1440 side=side*5%/1024
1440 LENDPROC
            580 key%=0
590 ENDPROC
              610 DEF PROCdrawpic
            620 %=620509
630 VDU 28,32,31,39,0
640 VDU 24,0;0;1023;1023;
650 s1%=LEN(ser$)
                                                                                                                                                                                                                                                                                                                                                              2200 SUBS depth, depth, #1
2210 BGT ploop
                                                                                                                                                                                    1430 DEF PROCSave
                                                                                                                                                                                    1440 CLS
                                                                                                                                                                                   1450 CLS
1450 ON
1460 INPUT"Filename: "savef$
1470 OSCLI("ScreenSave "+savef$)
                                                                                                                                                                                                                                                                                                                                                              2220 :
2230 LDR log,logarpos
2240 LDR depth,its
2250 MOV t,#0
            660 PROCassem(fast%)
670 $seq=ser$
680 FOR I%=0 TO s1%-1
                                                                                                                                                                                    148Ø OFF
            680 FOR 1%=0 TO 81%-1
690 seq?1%=(seq?1% AND 1)*4
700 NEXT
710 IF RND(-1234)
                                                                                                                                                                                    149Ø ENDPROC
                                                                                                                                                                                                                                                                                                                                                               2260 :
2270 .1100p
                                                                                                                                                                             1500 :
1510 DEF PROCreset
1520 VDU 26
1530 CLS
1540 ON
1550 PRINT"Old sequence: ";ser$
1560 PRINT"Enter new sequence (default=
cld)"
1570 INDUM":"in$:IF in$<>"" THEN ser$=i
n$:amin=2:bmin=2:side=2
1580 PRINT"Enter minimum a value (default=";amin;")"
1590 INDUM":"in$:IF in$<>"" THEN amin=V
AL(in$)
                                                                                                                                                                                    1500
                                                                                                                                                                                                                                                                                                                                                            2270 : IlCop
2280 FNifer8
2290 MOV xl,x,ASL#1
2290 MOV xl,x,ASL#1
2300 RSB xxl,#810000000
2310 FNmulti(r,r,xl)
2320 MOVS r,r,ASK#18
2330 RSBMI r,r,#0
2340 LDR r,[log,r,ASL#2]
2350 ADD t,tr
2350 ADD t,tr
2360 SUBS depth,depth,#1
2370 BOT 1loop
2380 :
2390 STR i,isto
2400 STR x,xsto
2410 STR r,tsto
2420 LDR gp,stackS
2430 LDR link,links
2440 MOVS pc,link
2450 :
2460 Abort
2470 MOV t,#660000000
2480 STR t,tsto
2490 STR xi,xsto
2490 STR xi,xsto
2490 STR xi,xsto
2490 STR xi,xsto
2500 LDR sp,stackS
           710 IF RND(-1234):
730 FROCtime_init
740 FROCcol(FN1(amin,bmin))
750 RECTANDED FILL 0,0,1023
750 M=2
770 REPEAT
780 FROCStatus (M**M*,640000)
790 L=side M*
800 H**=1024/M*
800 H**=1024/M*
810 FOR N*=0 TO M*-1
820 FOR N*=0 TO M*-1
820 FOR N*=0 TO M*-1
830 IF (N* AND 1) OR (N* AND 1) THEN
840 FROCCOl(FN1(amin-L1-N*, bmin-L1-N*, bmin-L1-N*, bmin-L1-N*, bmin-L1-N*, H*-1
850 RECTANDED FILL N**H*, K**H*, H*-1
860 ENDIF
                                                                                                                                                                                                                                                                                                                                                               228Ø FNiter8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3330 ]
3340 ENDPROC
                                                                                                                                                                               AL(in$)
1600 PRINT"Enter minimum b value (defau lt=",bmin;")"
1610 INPUT":"in$:IF in$<>"" THEN bmin=V
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3346 ENDPROC
3350 | DEF PROCmulti16 (ResHigh, num1, num2)
3370 | Ihs=10
3380 | rhs=11
3390 | OPT pas%
3400 MOV lhs, num1, ASR #14
3410 MOV rhs, num2, ASR #14
3420 MUL ResHigh, lhs, rhs
3430 | 3440 ENDPROC
             860 ENDIF
             870 NEXT:NEXT
                                                                                                                                                                               AL(in$)
1620 PRINT"Enter range for a and b (def
            880 M%=M%*2
890 UNTIL M%>256
900 ENDPROC
                                                                                                                                                                                ault=";side;")"
1630 INPUT":"in$:IF in$<>"" THEN side=V
                                                                                                                                                                                AL(in$)
1640 PRINT"Enter initial value for x (d
            920 DEF PROCtime_init
930 !timblk%=0:timblk%!4=0
                                                                                                                                                                                efault="; Xinit;")
```

Notes

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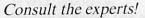
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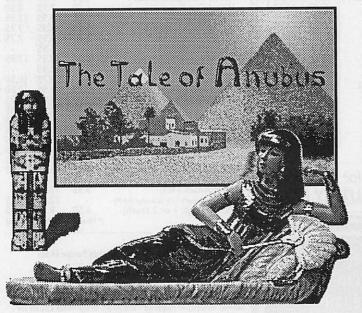


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GAME SHOW

eople usually have mixed feelings about New Year. After the effects of your celebrations have worn off you often pause for a moment, and either look back over the last year or forward to the next. However, when it comes to the Acorn games world it doesn't really matter which way you look, as 1991 was a record breaking year and 1992 looks set to be even better.

The Fourth Dimension is entering the new year full of promise. As well as plans for even more games than last year, people who have more than 1Mb of memory, or who have enhanced the speed of their machine with an Arm3 upgrade, will be pleased to learn that the company is determined to support users computer upgrades. According to Mark Botterill, '90 percent of the products released in 1992 will have 2Mb, Arm3 versions to supplement the standard game'.

This topic has always presented a dilemma for software producers. Ideally you want to produce a standard version that will run on all Risc OS machines, from the base model

to the most advanced. But that means that the people who have spent lots of money on the best model are no better off - surely they could have a superior game?

So far, marketing sense has always favoured the standardmodel syndrome and quite rightly so: you can't expect to lure people into buying a nice cheap machine if the software will then only work on the more expensive models.

But nonetheless, people with the more powerful machines are still justified in being disgruntled with the situation and its hitherto inevitable outcome. With The Fourth Dimension's promise to cater for the broad range of Risc OS models by producing numerous versions for many of its games.

The first title to receive upgrade treatment will be its Formula One racing game, Saloon Cars. By Easter a 2Mb, Arm3 version will be available; existing owners will encounter a small charge (about £10) for an upgrade. There will also be a version for people with 2Mb or more who do not have the Arm3 facility. The most noticeable difference



will be the smoothness with which the car moves - basically, expensive new suspension - though there are one or two additional perks: the rear view mirror will reflect everything going on, not just the cars behind you, and the other cars will have additional graphics so that you can see all around them. When one spins off you'll see its bonnet, doors, and so on before it smashes into the barrier, or you!

Four new courses for Saloon Cars have also been designed. Oulton Park, Donnington Park and two originals created by the author will be on sale around Easter time.

This multi-version policy is to be applied to most of its new games, and The Fourth Dimension has about 17 projects planned for 1991. At well over one game a month, this is good news indeed.

Karma is a game that lends itself nicely to the question of multi-version policy. Due to the colossal nature of the game the final version will only be available for machines with 2Mb or more. This will exclude quite a lot of games players but the theory is that

Karma is the sort of game that appeals to the more serious type of person - well, patient at any rate - and that's the type who tends to have more memory power. However, release one of Karma is available to all.

Karma is the space game everyone has been waiting for, in some cases for nearly four vears. It was advertised well in time for Christmas and copies were sent out with about fifteen days to spare. But it isn't the finished Karma, due to appear next year, merely the Flight Trainer, a highly cut down model basically intended to give players a feel for the fundamental aspects on which the game works - chiefly the flight controls.

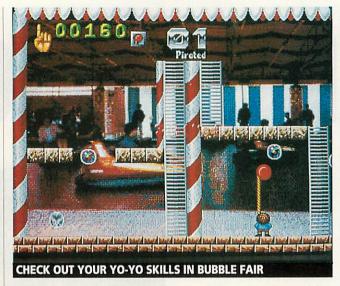
I wonder how this has gone down with people who've bought the game, because to play the Flight Trainer is, frankly, to be bored. Karma has received much hype, much fuss and much attention but all you can do at the moment is fly around and look at textureless circles which are supposed to represent planets. Those who have coughed up 25 quid may be wondering what on



earth (or beyond) they have done; and for 1Mb machine owners this is all they'll get.

The problem the publishers faced with this game is that, due to its very nature - trying to simulate 'life' - it is difficult to release just one part of it. You can't really simulate just one part of life. The result is that release one has no life simulation at all; you just fly around looking at specks and circles and indulge in slight interaction with other beings and spacecraft. I can imagine that some people expressed great outrage on discovering its limited extent because at present it doesn't really possess any of the qualities of a good game.

However, I've seen parts of the life simulator and graphics from the final game and they're not boring at all. I believe that Karma could be of enormous fun and interest once you are engrossed in it, but that is merely hypothetical since the next release has yet to appear. It is hard to know



what to suggest. Judgement will no doubt be passed in next month's review but for now would-be purchasers must realise that this release is merely intended as a flight trainer, boring perhaps but hopefully a good investment in preparation for the 'real' game next year; something I'm looking forward to very much, despite the disappointment of this 'stopgap' release. See next month for more details.

We've never had a high score sent in by a reader that supports its own proof of authenticity quite as well as a recent letter regarding the old BBC game Frenzy. Julian Henn, of Helston, Cornwall sent us a video tape of him playing the game as conclusive evidence that his score of 824,112 is as valid as it will ever be. We're impressed!

On the subject of scores and tips, thank you to everyone who sent in Lemmings' passwords - very nice of you indeed but I think we've got enough now. If this goes on much longer we will have to print a list of people greater than that of the passwords. We will print the full set of passwords next year as a prelude to Krisalis's release of 100 extra levels around Easter time. Until then, try harder! They can all be done.

Finally, I would like to extend an apology to Eterna Software for failing to include details of the company in the recent review of Bubble Fair two months ago. The game costs £19.95 and people wanting to buy it should phone (0933) 279300. It only remains to wish all those in the games world and all our readers, a very happy New Year.

Sam Greenhill

PANDORA'S BOX

The Fourth Dimension Tel: (0742) 700661 Risc OS machines £21.23 plus VAT

Isometric games have always been popular as an alternative to the usual 2D, platform-hopping style often employed in arcade adventures. Those who recall some of the classic releases for the BBC Model B, will no doubt remember Knightlore where all the action was displayed in an isometric view of the current location.

Pandora's Box is what Knightlore fans have been waiting for on the Arc. An arcade adventure in the true sense of the words, it puts you in the slippers of Merlin the sorcerer. You have to rid the land of evil by closing Pandora's Box, home to all sorts of nasty things. Four amulets must be found to seal it off.

From your house in the city you explore the land by walking through doorways and along paths. As in traditional adventure games, quite a few (apparent) dead ends must be overcome to progress further. Various objects such as keys can be picked up along the way to help you in your task, and lots of vital magical items collected to add to your sorcerer powers.

As well as the ultimate aim there are a number of minor tasks to be carried out. You're not the only person in the game and there are plenty of other characters going about their business, occasionally giving advice or asking for help. Being a fantasy game, not all of these are human.

Set in over 200 locations, the game is big. Even playing it non-stop for an hour or two, reveals only a small part of the land and, besides the city, there are forests, caves and mines to explore. There's enough here to keep even the most hardened adventurer busy for days on end, so a Save game facility is a welcome feature, just in case you want to take a break from saving the world.

All locations are displayed in rather nicely drawn graphics such as twinkling torches and



gushing fountains. These are well implemented, with everything running smoothly even when the screen is full of extra denizens. Apart from the introductory jingle, sound is nonexistent except for the occasional yell when Merlin confronts an enemy.

The only real moan is the amount of disc swapping; the adventure comes on two discs and also requires a disc on which to save games. Each time you die, two disc swaps are required: one to load your old position and one to run the game. There is no provision for twin drives, and like all The Fourth Dimension games, it is protected and cannot be transferred to a hard disc. Apart from that, I would rate it as the best arcade adventure around for Risc OS computers.

Rob Miller

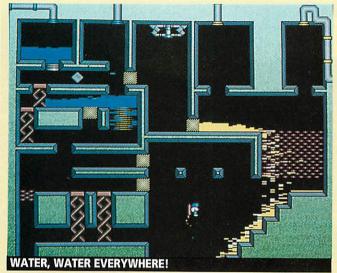
CATACLYSM

Fourth Dimension Tel: (0742) 700661 **Risc OS Machines** £21.23 plus VAT

There were about nine important things I had to do this week, none of which involved Cataclysm. And the fact that not one of them was done rests squarely on the shoulders of this new game from The Fourth Dimension. It's a real time waster!

The object of the game has an air of originality because no other game, to my knowledge, has tried to simulate the behaviour of water - but that's the main theme in Cataclysm. Water from pipes gushes into containers with bungs in the bottom. The main area is twodimensional with maze-type blocksand the whole thing's about two 'screens' high.

The idea is to collect all the water in a great funnel at the bottom, but if it's to flow into this you need to make sure that all the right holes are plugged up, the correct gates are opened and generally ensure



that there are no 'leaks' anywhere along the route.

You can fly up, down, left or right and place or remove bricks to build up walls to divert the water. There are zigzag pistons which collapse under enough water pressure and blocks which vanish when touched by water. In fact there's a whole range of blocks from porous ones that restrict you, to ones that allow you - but not water - to pass.

On most levels there are also little alien bugs that shoot at you and turrets that likewise have no affection. Oh, I almost forgot: the story line is something about your spaceship crashing into an ocean on some planet or other but that's not really important!

Sometimes there is no water, but acid instead... Touch this and you, well, explode actually! The best levels are the ones where you have to mix yellow and blue liquids to produce green. The funnel is well in with the environment you see.

Occasionally the alien bugs really bug you and I would have preferred more emphasis on the water aspect than the shooting. I tried level thirtysomething 65 times before completing it (it tells you how often you've attempted it), no thanks to a cute little munchkin bug who pulled a laser on me then winked, repeatedly.

But the thing is: I wanted revenge. Cataclysm really generates that 'one more go' feeling. The sound is rubbish and the graphics are rather plain but it is so addictive. The simulation of water is a commendable attempt. Although small blue tiles don't look exactly like liquid they are pretty convincing.

The degree of strategic difficulty is about average. All in all Cataclysm has an ancient feel to it, except that the water is a great novelty and the game extremely addictive. Easily one of the best of 1991.

Sam Greenhill

IAMES POND

Krisalis Software Tel: (0709) 372290 Risc OS machines £22.12 plus VAT

James Pond - Underwater Agent, 'licensed to thrill and make whoopy', and now licensed by Krisalis for the Archimedes! One of the nicest things about Krisalis' games is their irrepressible humour. In James Pond, itself an enjoyable mix of arcade adventure and ecological thriller, you have a delightful Bond spoof, with full advantage taken of the opportunity for jokes on the 007 theme.

The fishy central character you control moves through a series of 12 largish, scrolling scenarios. Each contains a threat to the earth, either a mad scientist, nuclear accident or whatever, which has to be removed. Saving the world usually seems to involve collecting several of a particular object (sponges to plug a leaky oil tanker, keys to free trapped lobsters) against the clock.

Along the way there is much fun to be had avoiding the astonishing variety of aquatic nasties who valiantly try to stop you. You defend yourself by blowing air bubbles big enough to trap them, and boost your score and speed by collecting any of the plethora of bonus objects which seem to litter the ocean.

However, you're not confined to the sea - James (in his tuxedo) can easily venture out on to dry land or even into the air, but this does cause his Fishometer energy level to drop more rapidly than usual.

One especially innovative feature is the Home Pipe which appears on every level and leads back to James' luxury sunken home. There you can store and retrieve any of the useful objects you find on your missions. I also particularly liked the loading ditty



which is a reggae version of the 007 music. Scrolling is smooth and the graphics are colourful and well designed, although some backgrounds seem rather plain, only being in one colour.

Other nice touches include hidden caverns full of goodies, and a continual stream of bub-

bles rising from the seabed to sustain the underwater atmosphere. Although technically James Pond is not quite up to the standards of, say, Chuck Rock, especially in terms of graphics, it is well worth snapping up for its playability, humour and staying power.

Mat Tizard

Waterloo

Turcan Research Systems 83 Greencroft Gardens London NU6 3LS Risc OS machines £25.95

As a war-gamer I have fought the Battle of Waterloo many times, using thousands of model figures and a handful of theories. It is a battle that captures the imagination and defies a lot of logic, and as every good Frenchman will tell you, 'It was a close run thing.' It's refreshing therefore to find a game that in many ways provides a realistic and flexible simulation of the events of June 18 1815.

At the start the player has a number of options to choose from, including whether or not a human will play the commander-in-chief, and the choice to change the historical orders of the day. From then on the object is to use your tactical 'genius' to gain as many points as possible and win the battle. Simple really!

To progress, background reading is advisable - if only because the battlefield is a confusing place with umpteen different formations in a confined space. This complexity is reproduced by a mass of information and orders received and given in 15 minute turns. Having said that, it is also easy to lose perspective if you don't have your trusty map handy.

Taking command is the



obvious key to this game, but giving battle and support orders can be hard if you're not sure who's who and what's what. This is because orders are sent down the command chain and the program is quick to pick up on imprecision. Forget the chain of command in the heat of battle and your orders will be rejected.

The graphics are highly accurate, if a little straightforward. Units are represented as different coloured blocks. These are defined in the manual, so to begin with ensure that it is close to hand.

The map supplied gives you a good overall feel for the terrain and the program itself gives a realistic view for the commander. The telescope, which uses the mouse as a viewfinder, enables the identification of buildings and units within the area of the headquarters, and the commander is frequently given the chance to change the position of his HQ to check on proceedings.

In 1815 it was not the done thing to aim directly at your opposing commanding officer, and so Wellington charged around all day. Having a mobile headquarters is a good way to achieve this; it keeps the commander in touch, without giving him a God-like view of the whole battlefield.

This raises the question of how much control a player has over the program. It is possible to make few commands and rely solely on historical orders. However, try this and you are inevitably told that you have the tactical awareness of a

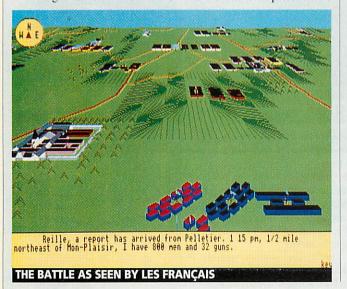
walnut and are relieved of your command. Alternatively, you can really go for it, and test out your own pet strategies to make it a true game of skill.

I advise the latter, with the proviso that you take note of the updates given throughout: this is a well-researched simulation in terms of both events and their timings. There is enough basic information for the general game player, but the need for background reading can't be overstressed.

In fact, the most pleasing aspect for a war-gamer is the realism. This is probably as close as you will get to Wellington and Napoleon's decision making, obscured as it was by the confusion of battle without the modern communications that some battle simulations seem to assume.

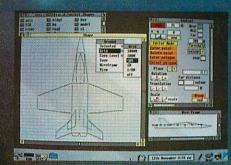
The game is spectacular in size and has nice touches, such as the sound of gunfire. But its main attraction is that you have the chance to change the course of history. Did Napoleon really just have a bit of a bad day? Waterloo gives you the chance to find out!

Matt Prior

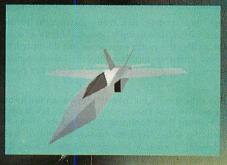


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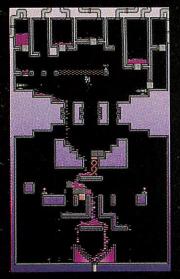


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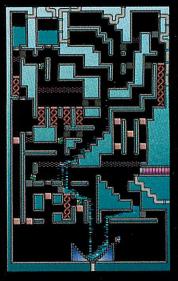
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Catalysm







"A Stunningly Original and Watery Game!"

Scenario

Unable to escape the gravitational pull of a truly massive planet, the cosmic exploration ship hurtles ever nearer to the planet's surface. The moment of impact fails to happen. Horrendous creaking sounds, and the faintly audible sound of running water provide sufficient evidence to enable the ship's supervisor to eventually grasp the situation. Submerged beneath a vast and alien ocean, the *Orcna* is gradually disintegrating...

Game

Playing the part of the ship's supervisor, your task is to expel water from different sections of the ship via hydraulic pumps, to give the ship's semi-organic outer shell time to repair itself. The water enters each section through a network of pressure-relieving pipes, and must be directed towards a collecting vessel using several manipulating blocks. This must be accomplished within a time limit, before the pressure becomes too great.

The various sections of the ship contain numerous features to further complicate your task. Pressure valves, dissolving blocks and filters all affect the flow of the water. Additionally, the water's presence has disrupted the ship's computer, which is now intent on terminating your existence using the on board weapons' systems, although it is possible to acquire fire power of your own.

As the *Orcna* is an exploration ship, it contains many strange alien life forms, gathered from distant galaxies. The now chaotic computer has taken upon itself to release these creatures from their confining cells, and the aliens are rampaging freely throughout the ship. Needless to say, several of these species are particularly unpleasant. Your task is to prevent the disaster that would occur were the *Orcna* to succumb to the icy water that is flooding into the ship. Your task is to prevent a cataclysm.

Program

Cataclysm is a stunningly original and unique game. As well as incorporating conventional sprite and pixel plotting techniques, a cellular automata is employed to generate realistic fluid motion. A simple set of rules is applied to each individual droplet of water, with hundreds of droplets forming a dynamic fluid which flows around the various on-screen objects. The water will adopt the shape of any container, and even exhibit tiny air bubbles. Later levels incorporate extended fluid routines to create frothing acid, and coloured liquids that mix on contact. Optimised sprite routines allow the presence of various aliens and over one hundred parabolic particles and bullets, all moving extremely smoothly at a high frame update rate.

Guiding the water through the various features and into the collecting vessel requires logical thought, coupled with arcade reflexes. Cataclysm successfully combines both puzzle solving and shoot'em up elements to create an immensely playable and enjoyable game.

Technical Specifications

50 Hertz cellular automata generates realistic fluid motion.

Over 1000 individual droplets of water on screen simultaneously.

Water, sprites and over a hundred independent particles and bullets updated at 50 frames/second.

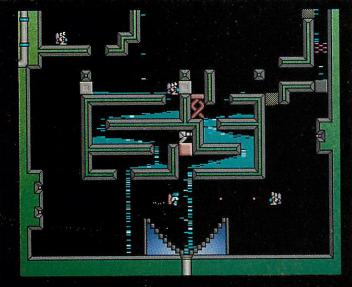
256 colour graphics, 320*640 pixel playing area with superbly smooth animation and scrolling.

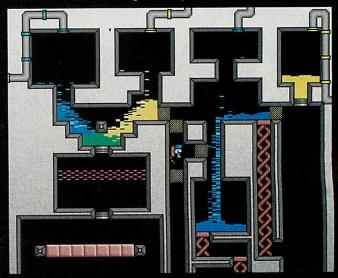
Over 500k of superb sampled music and sound effects.

40 increasingly complex and difficult levels.

Numerous features including valves, dissolving blocks, remote control doors, drip-valves, linear and parabolic guns, increasingly available fire power, various types of aliens, acid, coloured liquids, guided bullets etc...

BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91





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Grievous Bodily 'ARM





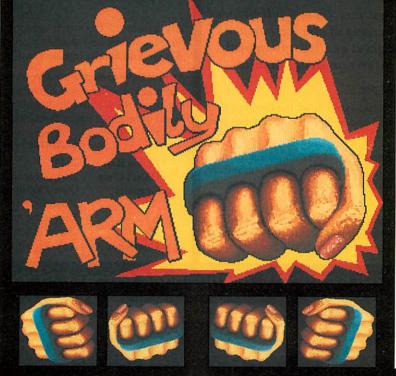
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Punching, kicking - finding weapons along the way, you fight through hordes of junkies in streets, warehouses and sewers until you reach the mad scientist's laboratory where you must 'deal with him for good'.



The Development Team

Comprises a Software Engineer and Graphic Artist who previously worked for years in the American arcade and home console markets, writing ultraplayable games that have sold around 1 million copies worldwide. Now writing for the technically superior Acorn RISC based range of computers.

Techno Stuff

Frame Rate 50 Frames/Second Constant

Object Code Handwritten Arm Code and Basic

Graphics Over 1.5 Mbyte. High Speed Custom Written Graphics Handlers

Sound Digitally Sampled

Computer Archimedes with 1 Mbyte or more

Inputs Keyboard or Joystick

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Prologue

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Quest

The powerful Panmetric graphics system allows you explore complex rooms and stunning landscapes whilst still having plenty in reserve to handle frenzied battles.

At first only armed with a keen wit you must acquire knowledge and magical weapons as the adventure gives way to arcade action. Exploring the length and breadth of the land you could conquer a world of magic or die in obscurity.

Technical Information

Frame Rate **Object Code** 25 FPS

Graphics

150k of Handwritten Arm Code Over 1000 sprites totalling 3Mb of graphics

256 colour, mode 13 graphics Panmetric graphics system

Sound Computer Digitally sampled sound effects

Any Archimedes with 1Mb or more

BBC A3000 & Archimedes Price: £24.95











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Pame	Store	Comment
Merlin	4400	Silly
Chris	1200	Tramp
Andrew	800	Leper
Stuart	400	Dung
Gordon	0	Smell
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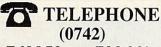


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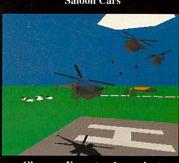


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Cataclysm



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LISTEN & LEARN

RICHARD GARRETT brushes up on his musical prowess with a package from EMR

ack in the late 70s when American manufacturers developed the Musical Instrument Digital Interface (Midi), they thought they had come up with a neat way of driving several synthesises from one piano keyboard.

What they had actually found was a way for composers, musicians and arrangers to develop music single-handed, without the help of other musicians. Today you can sit down with a computer, keyboard and drum machine and make music – without virtually no musical experience at all. The current Top 20 is full of examples!

So far, this music technology has only crept slowly into the school classroom. This is because most Midi software is devoted to the time consuming process of composition. To write and arrange a three minute piece probably takes one person a minimum of a day, during which time he or she needs sole access to a dedicated computer running a sequencer, a keyboard, at least one synthesizer and preferably a pair of headphones to save the groans of those nearby.

Add to this, the cost of all the equipment and the relatively low priority music is given in the National Curriculum, and it is hardly surprising that relatively few schools have invested in Midi.

This has prompted software writers to look for other ways of exploiting computers and music in the classroom. *MicroStudio* by Electromusic Research has been designed primarily to teach keyboard skills and sight reading. The student sits at a keyboard and plays a part shown on the computer screen while a synthesizer plays all the other



instruments. In addition to scrolling through music on a stave, the display shows you which piano keys you press and when. If you have ever used a touch typing tutor, this method will no doubt sound familiar. Music can be loaded from *MicroStudio* or *Studio24 Plus* files on disc, or 'recorded' from the keyboard. Individual parts can be modified, given lyrics and printed out by a basic score editor.

The minimum hardware needed is an A3000 or Archimedes, an EMR or Acorn Midi podule, two Midi cables, a multi-timbral synthesiser and a pair of headphones or alternatively, an audio amplifier. An important point to note that this is one music program that does not recognise the Serial

Port Econet Midi card, even the card is compatible with Acorn specifications.

Before describing the program in detail, it might be useful, for those who have not used Midi before, to go through some of the jargon.

MIDI MATTERS

Midi programs are often referred to as 'sequencers', because they send timed sequences of instructions to electronic music instruments.

The data files which they deal with are called songs or tunes and are divided up into sections called tracks (as on a multitrack tape recorder) or parts (like instrumental parts on sheet music). Each track carries the music to be played by a given instrument and can

be assigned to a particular sound source via one of 16 Midi channels.

In times gone by, each channel would be connected to a physically different synthesiser or drum machine, but now many synthesizers are multitimbral, which means they can play a number of sounds or voices, on several channels at any one time.

OPTIONS

MicroStudio comes on a single disc with two start-up options, for 1Mb and 2Mb-plus machines. There is no apparent difference between the two – the 1Mb version simply grabs as much memory as it can before running. The program takes up the whole screen and uses its own menu system in

which, for some reason, parameters are selected by the left mouse button and altered by the middle and right buttons.

When the program starts, a sampled voice comes out of the Archimedes saving 'EMR Microstudio' and your Midi equipment plays the opening bars of an 18-century air by Thomas Arne. This is quite entertaining the first time you hear it, but gets distinctly boring after a while.

The main screen is split horizontally into four sections:

- A status area giving information about the current tune and track
- A display showing the current track in musical notation
- A row of control icons and the image of a piano keyboard.

As a keyboard tutor, the package is fairly simple to use. First, you load a piece of music from a menu which drops down over the keyboard image when you click on a file icon. You then select Start and the synth plays something like the intended tune. Although tempo, time signature and all the notes will be right, the first time you run the tune the voices will almost always be the wrong ones!

The reason is this: the situation with sequencers talking to synths is similar to that of wordprocessors selecting fonts before the advent of sensible printer drivers. Every model of synth comes with a different set of voices arranged in a different order which often results in tunes where the bass part is played by a flute, the clarinet by a distorted guitar, and so on. To fix this, you simply flick through each track, selecting the synth voice that best approximates its title.

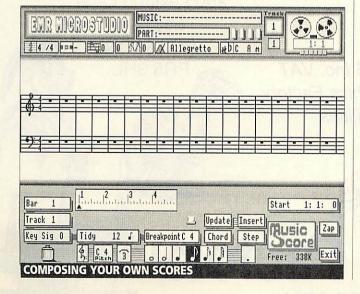
Voice and pitch changes can be made from the main screen. The program supports up to 24 tracks, so if you run out of Midi channels, you can use internal sounds from the Archimedes, via the EMR Wave Filing System.

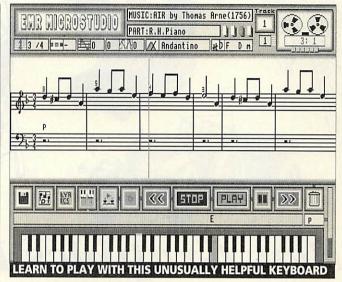
PLAY ALONG

Once the tune is set up for your synth, MicroStudio offers several ways of playing along. According to settings on the teacher's page, you can play with or without the accompaniment or the track you are trying to learn. As the tune unfolds, the notes you need to play are illuminated on the screen keyboard and your position in the tune is shown by a red line on the stave and a 'tape counter' which gives your position in bars and beats. There is also a learn mode in which the computer waits for you to press the right key and gives marks at the end of the piece for timing and accuracy.

Playback is controlled by recorder-type tape icons underneath the stave but, unlike a normal tape recorder. pressing the start button always plays the music from the beginning, while fast forward and rewind only scroll the sheet music back and forth without altering the start point.

If the tune is too fast or too slow you can change the metronome settings on the main screen. This is the only music software I've seen that uses Italian terms like Largo, Moderato and Allegro for





tempo instead of displaying beats per minute. This will no doubt endear it to classical music teachers.

To create your own tune, you simply click on the record icon and then press Start. The computer gives you a metronome pulse to keep time and records anything you play, displaying it on the stave as you go along. If you make mistakes, you can either trash the whole track and start again, or do what studio musicians call a 'drop in'.

This means only recording over the parts you got wrong, while leaving the right parts alone. With MicroStudio, this is done by setting the Punch in option, which runs the track in the normal way, but waits until you press a piano key before recording. To 'punch out' again you just tap the Space bar. To clean up individual notes there is also a stave editing function, but it is a bit tedious as it only adjusts one note at a time and does not allow moving and copying of whole phrases.

The edit menu also enables you to tidy (quantise) your work by moving played notes on to the nearest beat, and to print out the current track on an Epson compatible printer.

CONCLUSION

MicroStudio fits well into traditional methods of music teaching with its emphasis on classical notation, sight reading and keyboard skills and its testing options fall nicely into line with the Associated Boards system. The package comes with a well written and

well indexed manual (except it doesn't tell you how to quit until lesson 59 - perhaps this is intentional.) It is supported by a small library of classical and contemporary data discs, priced between £8 and £13 pounds each.

On the down side, I think the display is cluttered with too much track information, that is irrelevant when music is playing; and it has file, edit and trash icons that could be better consigned to a hierarchical menu system.

If this is to be a truly 'content free' program, the recording side needs some improvements and the method of editing needs to be made more intuitive. I would also like there to be options to load standard Midi files and to edit all of the 24 voice assignments from a single screen.

To summarise, MicroStudio is an interesting package aimed at very specific way of teaching music and, if that is the way you want to teach (or learn), I suggest you try it out. It is, however, a package which would be more accessible if developed further, with more attention devoted to Acorn and Midi conventions.

PRODUCT DETAILS

Product: MicroStudio Supplier: Electromusic Research Ltd, 4 Mount Close, Wickford, Essex SS11 8HG Tel: (0702) 335747 Price: £67.23 plus VAT Machines: Archimedes and A3000 with Acorn or EMR Midi podule installed



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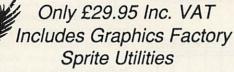
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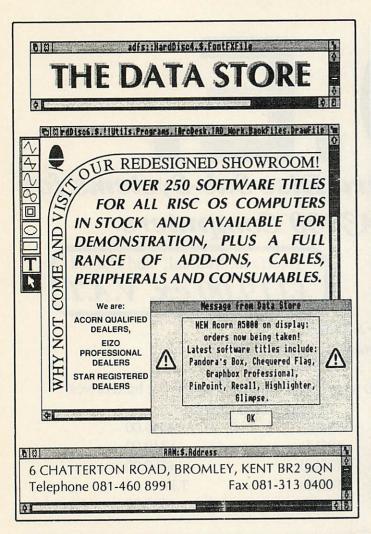
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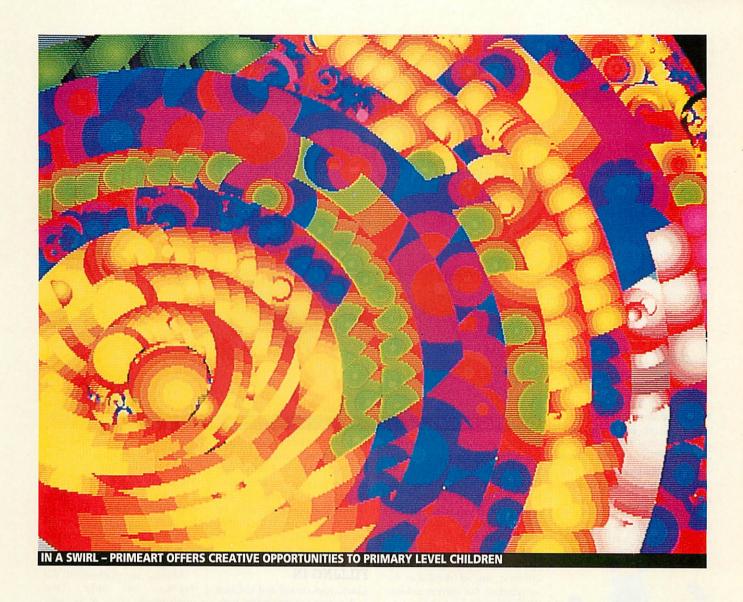
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PRIMARY COLOURS

Can the latest art package bring out the artistic talents of young children? CHRIS DRAGE puts PrimeArt through its paces

many software houses have been quick to realise, the Archimedes provides an ideal art platform. As a result, there are a number of sophisticated art packages on the market: Artisan 2 and Pro-Artisan (Clares), Atelier (Minerva) and Revelation 2 (Longman Logotron) are just a few of the better ones.

If any of these have a shortcoming, it is that the user interface is usually too complicated for primary school children, although some graphics programs are better than others in this respect.

At the primary level, children are 'picture processing' with the basic computer tools: they draw simple shapes and fill and manipulate images using the building-blocks of the more advanced techniques used at the secondary level. As they begin to see computergenerated art as electronic

'picture processing', children can enjoy creating their pictures on-screen as much as they enjoy creating text via a wordprocessor. Just as they learn how to manipulate words, so they can learn to manipulate images - the art packages providing the same opportunities for editing and altering pictures as word processors do for writing.

The theory behind art software is to provide children with an alternative to the constraints and restrictions of the traditional classroom materials and modes of working. Art packages tend to be contentfree, leaving users free to express themselves through the software, or via hardware add-ons such as a touch screen, mouse, trackerball or other input devices.

The Archimedes offers a superb environment for placing screens and sprites in other

Risc OS applications, simply by dragging them into place. Minerva's PrimeArt fills the need for an equally simple means of creating these screens and sprites.

START UP

Getting PrimeArt running couldn't be easier - click on the filer icon to install it on the icon bar. Sensibly, Minerva allows the original disc to be backed-up to another floppy or your hard disc, for security and peace of mind. Click Select over the PrimeArt icon to open an empty Mode 15 screen. If you have used the program previously the screen will open with the painting tool and colour you selected last.

While the program is in use all desktop operations are suspended, but it can be returned to at any time; PrimeArt does not lose its current picture when it is re-accessed. This departure from the desktop is deliberate, allowing access to the whole of the screen for painting and provides the added bonus of speeding up operations, such as complex fills.

However, it does mean that printing and saving operations are conducted via a menu



system and not in the usual Risc OS manner.

All painting facilities are accessed using the Toolbox and Menu, with certain keyboard shortcuts. Clicking Menu on the painting area reveals a pop-up toolbox with over 40 items from which to choose. As you move the pointer over each icon cell in the Toolbox, a Help panel, situated at the bottom of the window, briefly describes its function - this is intended as



an aide memoire, to complement the 60-page manual.

The Toolbox itself divided into two sections. The top section is devoted to colour and brush selection. Six brush shapes are provided on either side of the palette, which shows the eight primary, secondary and tertiary colours; any of these can be selected as the current colour. However, by selecting two different colours from each of the side-palettes you can produce a graded scale of colours, ranging between the two extremes, to achieve graduated fills. A small window shows the graduations and allows individual colours to be picked up. Colours may also be picked up directly from the screen - the tool is drawn in the chosen colour and is useful to help children remember what colour they are currently painting with.

The bottom part of the Toolbox has 32 icons representing various functions, eight of which have submenus offering further facilities relevant to that particular icon. A little exploration reveals some rather sophisticated and clever functions in addition to the usual painting and drawing facilities: graduated colours can be painted in cycles while single colours can be mixed

with other colours on-screen to give greater variety; mixing black or white will darken or lighten existing pictures, producing highlights shadows; colours can also be used as a 'cover', to further modify colours, or 'washed' to blend adjacent colours.

FILLING IN

Lines, rays, filled and unfilled rectangles and triangles comprise the principle 'straight' shapes. Using the Curve menu, arcs, segments, filled and unfilled circles and ellipses can be drawn - all of which are great for extending work on spatial mathematics.

Without a doubt, PrimeArt's jewel-in-the-crown is its fills there are no less than 11. These fall into groups: vertical, horizontal and circular fills; fitted or open; smooth or banded, or just plain. The ease with which a rectangle can be transformed into a smooth cylinder amazes children.

Moving the pointer off the Toolbox or Menu will immediately close it. In most cases this is fine, but I would have liked the option of a permanent Toolbox. Children who find it hard to control the pointer with the mouse tend to lose their Toolbox quite often. It is easy for young hands to



accidentally move the pointer off the edge, when trying to select a function.

Any function can be undone at the press of a key providing that you have not accessed the Toolbox or Menu. This ability to undo operations definitely encourages a great deal of experimentation with techniques. However, there are times when all that is required is a little close editing.

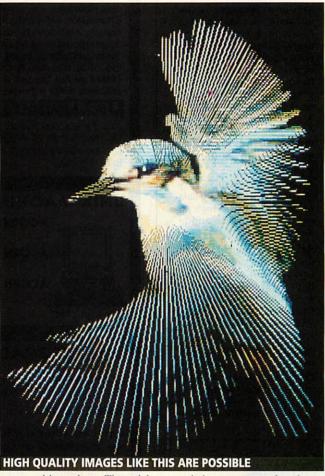
To enable editing at pixel level, PrimeArt has a magnifying glass icon that opens a window in which individual pixels can be coloured. Colours can be picked up from within the window and pixels altered accordingly, the effect being seen in a representation of the area being edited. Scrolling arrows allow the window to move over the picture so whole areas can be covered quickly, and then altered as required.

SPRITE SELECTION

Using the Sprite menu, a small picture or sprite can be cut out of the screen, named and stored for further use. Alternatively, standard Mode 15 sprites can be selected from a multitude of sources such as clip art, scanned, digitised and Paint images, all of which can be loaded, named and stored -PrimeArt can store more sprites than most children will be able to use in one session.

Once in the store, sprites can be sized, positioned, rotated, flipped (vertically and horizontally) or tiled, using the most novel tiling tool I've yet seen on a computer. Children perform tesselations in mathematics and appreciate its complexity even using simple shapes, so being able to place a multiplicity of sprites so quickly is great fun. Some interesting wallpaper designs can emerge!

Non-rectangular sprites (that is, sprites with masks) can be created by running Paint alongside PrimeArt, the sprite files being transferred back and forth between the two pro-Selecting grams. Sprites instead of Colours from the Toolbox enables sprites to be used for painting, and Cover and Mix will create some interesting results. Similarly, extraordinary effects can be obtained by filling shapes and



areas with sprites. The trick here is to select the right type of fill to suit the shape and the sprite. A horizontal, fitted and banded fill produces pleasing results, whereas selecting vertical or smooth fitted fills produces quite zany effects.

Most graphic and art programs enable text to be placed on the screen and PrimeArt is no exception. From the Text menu size and height can be set to small, medium or large, with the system font used as the default style. Providing !Fonts has been seen by the filer, PrimeArt permits any available fonts to be chosen from the list and used instead. Text size can be set manually to allow for large headings or titles but if you want it to be set at an angle, or vertically, then you would have to position the text, cut it out as a sprite and rotate it.

As text takes the currently selected colour, some interesting experimentation can take place by overlaying and offsetting the same text in a variety of different colours. Interesting shadow and 3D effects can be achieved by repeatedly offsetting text in a graded sequence of colours. Text can be deleted before being placed on-screen by pressing CTRL-U, but once in place the only means of removing it is to paint over it in the background colour.

All pictures can be saved via the Disc menu as either standard sprites (for import into other Risc OS applications) or as PrimeArt pictures, whereupon they are stored on disc in a compressed form. The Print submenu has four options; Small, Portrait, Landscape or Poster. The Poster option divides the picture into four, and prints it out over four sheets of paper which are then joined together.

If you have a dot matrix driver, you can set the page length to 600mm before making a poster print. This allows consecutive sheets to join up, simplifying the task of joining them together.

Despite the help messages, with over 40 items in the Toolbox I must confess I was a little confused at first, and eight-year-olds just couldn't manage it at all. However, Minerva has provided a means of simplifying the Toolbox, allowing it to be customised to suit particular needs and requirements. Setting a toolbox up is quite simple. As it can be password protected, a variety of toolboxes can be assembled, and safely stored, to introduce individual or groups of operations as each child is ready.

Once in Toolbox edit mode, the icons can be moved or deleted. In a manner similar to that used to create Concept Keyboard cells, repeating icons in a block of cells results in a larger overall block. This helps children who find it hard to use a mouse accurately.

CONCLUSION

Undoubtedly for younger children, it is the ability to hide many of the huge range of functions which is one of PrimeArt's major attributes.

Another useful feature is that a particular setup can be saved with a child's picture to load back automatically when the work is recommenced. Different setups can be created and saved to suit particular projects or tasks.

While doing this review I felt that, in a program with so much to offer, it was unfortunate that Minerva had not gone further to accommodate young children and those with special needs. I noted that I would like to have seen a Concept Keyboard driver so that the Toolbox could be taken off screen and put on an overlay, enlarged and with descriptions. I am pleased to say that, subsequently, Minerva has provided such a driver. The overlay is included as a draw file and is modifiable to the current menu setup.

In general use, once children have established the hand and eye coordination that mouse control requires, PrimeArt fulfils its promise of bringing the power of the A3000 and Archimedes to the aid of budding young artists.

PRODUCT DETAILS

Product: PrimeArt Supplier: Minerva Software, Minerva House, Baring Crescent, Exeter EX1 1TL Tel: (0392) 437756 Price: £79.95 plus VAT (inc primary licence) Machines: A3000/Archimedes

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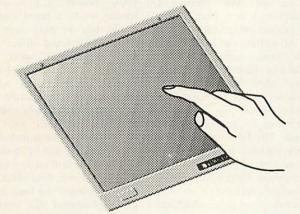
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ANYONE FOR

ROB MILLER looks at two programs designed to cut your files down to size

ntil recently, the only effective way of increasing the storage space of an Archimedes was to add another or larger hard disc. The other approach is to make the most of what you already have by using the available disc space more efficiently.

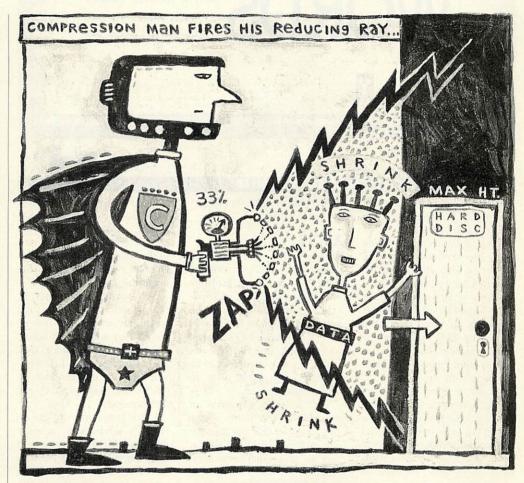
Data compression is one of the most useful techniques available to programmers and users alike. Imagine trying to design a spell-checker program that contains an 80,000 word dictionary, stored in an uncompressed form. If you imagine that one letter occupies one byte, and each word contains on average five letters, that would be 400,000 bytes, or 390K. Obviously, some form of compression is needed. By using a combination of methods, a typical dictionary can be reduced to one-third of its original size.

Graphical data (in other words, bitmap images) also requires a large amount of storage space unless it has been compressed in some way. A number of standards exist for this purpose. Typical reductions obtained are between one third to one fifth of the original size, depending on the type of method used.

Two programs now exist for the Archimedes - Compression and ArcFS - that compress files in order to save disc space, and each takes a slightly different approach to solving the problem.

COMPRESSION

Compression from Computer Concepts is designed as a part-replacement for whatever filing systems your Archi-medes supports. It is an application that will compress and decompress any files dis-



creetly, whether they are being saved to, or loaded from, a filing system.

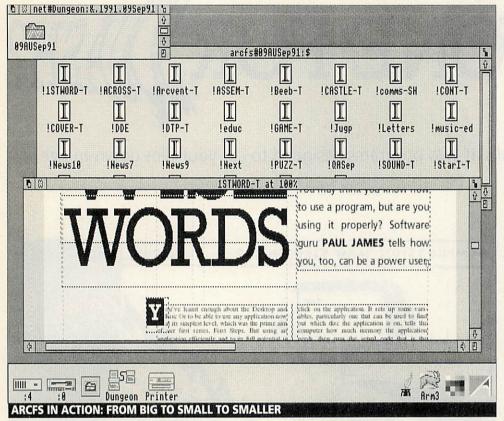
Loading the Compression program installs it on the left hand side of the icon bar, alongside the other filing systems. Originally this icon mimmicks the action of floppy drive zero, but you can configure it to start up with any other filing system you may have, including the Ram disc.

Computer Concepts is well known for its contribution to the Archimedes icon design, with classy three-dimensional buttons for Impression. However, the Compression

icons are far less exciting. Clicking on one of these CFS icons on the icon bar opens the root directory viewer in the normal way and files can be dragged to or from the filer window. A file being saved is automatically compressed and a file being loaded (if already compressed) is decompressed. Compressing existing files (those already saved somewhere on a filing system) is easy and involves dragging from the normal directory window to the corresponding CFS directory window. However this should be done with caution - I lost several applications in the process, due to parts of them being locked.

All current types of filing system are supported including ADFS, SCSI, IDE RamFS, and Network. Even pseudofiling systems such as Arxe Systems' MultiFS will operate quite happily alongside Compression. The new 1.6Mb F format in Risc OS 3 works fine, as do the various PC and ST formats that are supported by other software.

Because Compression is a true filing system, it can be used outside of the desktop, from the command line and Basic. All filing system comILLUSTRATION BY SPIKE GERREL



mands will function as normal, except that files created are in compressed format.

Once a file is saved on to the Compression directory viewer, it also appears in the directory viewer of the normal system, as an orange square with arrows either side. But it cannot be accessed: you have to use the CFS version of the filing system to load or run it.

This may cause a potential problem with applications. It may not be obvious that an application is compressed, therefore double clicking on the application will have no effect, and sometimes give an error, disastrous to the uneducated. Using SHIFT plus double click, opens the application directory revealing whether you will need CFS to run it.

Another quirk is that you can compress already compressed files. These will then appear in the Compression directory viewer and have to be decompressed twice in order to run them.

Incidentally, if you want to send compressed files to someone who may not have Compression, all they need to have is a Public Domain program called CFSReader, to decompress the files. We have included on our monthly subscribers' disc. (Turn to our subscriptions form on page 31 for more details.)

ARCES

Anyone who uses bulletin boards or obtains software from PD libraries is probably already familiar with an application called Spark - an archiving program that allows several files to be squashed together into one file. Various compression techniques can be applied to archived files to reduce them in size.

ArcFS is an extension of this idea in that it provides a filing system that can manipulate archived files in a similar way to an ordinary directory. Applications can be run from it and files saved into it. There is also a PD read-only version so archives can be accessed.

It differs from Compression in a number of ways. First, it can compress a number of files into one single file. ArcFS treats this archive file as a separate directory, but it can be manipulated as one large file within normal file systems.

ArcFS also offers the ability to protect any archived files with a password. This password must then be typed into the computer in order to read any of the files contained within that archive.

Before compression of any

file can take place, an archive must first be created. This is simply a case of dragging the archive file icon from ArcFS to the chosen directory viewer. Double clicking on this file opens the ArcFS viewer.

Subsequent treatment of files is similar to Compression; when they are dragged into an ArcFS filer window (of which eight can be open at once) they are compressed. Likewise, when they are dragged from an ArcFS filer window, they are decompressed.

Later versions of Spark, ArcFS's predecessor, actually multi-tasked. This proved a boon for networks, as the fileserver could be backed up on to another hard disc while other people worked on the network. However, ArcFS jams up the machine until its task is done.

Users of Spark are able to read old archive files directly with ArcFS, and with a short conversion program, write to them as well. Like the Compression program, ArcFS will work with all current filing systems and disc formats.

As ArcFS is also an actual filing system, it will operate perfectly well outside of the desktop environment, from the command line. Commands are provided to create, open and close archives, so files can be saved to or loaded from them.

CONCLUSION

So how do the two packages compare? Well, if you want a system that requires the minimum fuss to compress and decompress most of your files, then Compression comes out as a clear winner.

If you install it on a hard disc and set it to start up when the machine is first turned on, it is virtually transparent in use. The only difference you would notice is the slightly longer time to load and save files. However, it can be a little confusing to start with and a dry run is recommended.

From a technical point of view, there is little to choose between the performance of the two packages. They both achieve roughly the same percentage compression when they process files. The time taken to compress files is greater with ArcFS than with Compression, which roughly seven times faster.

In the end, it really depends on what (and when) you want to compress. If you have limited space on your hard disc and would like to continually compress files to save Compression disc space, should be your choice.

If, on the other hand, you wish to make occasional backups of files, archive files, squash more on your floppies for transfer to other machines, or just compress large files like bitmaps, then ArcFS is the more suitable of the two, with an added password facility.

Compression costs almost 10 times as much as ArcFS. You get a clear manual with Compression, while ArcFS includes information only on disc - designed to compress rather than impress.

PRODUCT DETAILS

Product: Compression Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel: (0442) 63933 Price: £49 plus VAT ArcFS and CFS Reader are available from most Public Domain Machines: Both are compatible with the BBC A3000/ Archimedes

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ewlett-Packard's Deskjet printer has become something of a best seller well-known for its laser quality output at a reasonable price. Now the new Deskjet 500C has gone a step further by providing full colour printing at a resolution of 300 dots per inch (dpi) - for the A3000 and Archimedes. This is the sort of quality you would expect from colour laser printer - but with laser printers costing up to £10,000, the Deskjet 500C at £749 makes a very tempting alternative.

The 500C is an inkjet printer it squirts a tiny drop of ink at the paper to make each dot. The process is slower/than with any laser printer, but faster than most dot-matrix machines, and it is near silent and capable of clear, highquality output.

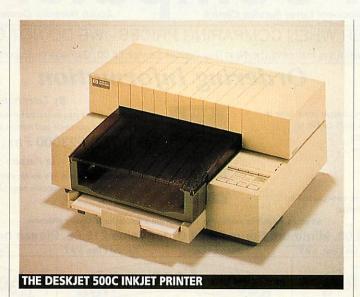
OVERLAYING COLOUR

Colour printing with the 500C is achieved with a three-colour ink cartridge (yellow, magenta and cyan) which overlays the three colours in varying degrees to form the hues required - in the same way as the colour images in this magazine are built up by printing inks of those three colours, plus black.

The 500C creates the black areas of the image by printing all three colours together. In fact, this produces a dark, sludgy brown - not really black, but probably close enough for most purposes. However, the 500C can print proper black by removing the tri-colour ink cartridge and fitting the black-only cartridge that is usually used on monochrome Deskjets.

The tri-colour ink cartridge contains around 50 nozzles and heating elements that make up the printhead. In fact, the colour cartridge is almost identical to the black version of the monochrome machine.

The printer can sense which type of cartridge is fitted and with a black ink cartridge installed, the Deskjet operates just like the old monochrome model. In fact, with a colour cartridge fitted, the 500C is only really useful for graphics images, such as sprites or publishing desktop (DTP) pages. This is a little less convenient than most colour





Colour laser print quality, for under £800? GEOFF BAINS tries out the new HP DeskJet

printers which have black ink included in the colour cartridge, but it actually good sense. Most of the time it is just black ink that is needed - with other colour printers you end up throwing away a lot of expensive coloured ink just because the black ink has run out. This does not happen with the 500C.

The ink is expensive, too. Black cartridges cost £14 and last about 500 pages. Colour cartridges cost £25 each and will print around 180 pages less if you put a lot of colour on the page. However, the cartridges are easy to fit and a small matching box is pro-

vided to hold a spare cartridge. Like a laser printer, the 500C uses only cut sheet paper, fed automatically with an amazing assortment of levers and gears from a 100-sheet paper tray at the base and collected (in reverse order) face up in the out tray. The 500C is equally home when printing envelopes or even clear sheets for overhead transparencies.

Three character fonts (Courier, Times and Gothic) in a variety of sizes are built-in. Only the Laserjet PGL/3 control language is provided but, for monochrome work, this easily handles straight Ascii printing or graphics with a

Laserjet printer driver. Printing colour requires an extended Laserjet driver such as the HP Paintjet/500C driver from Ace Computing. Used from the desktop the 500C then operates just like any other printer, but in colour. However, desktop software deals with colours as proportions of red, green and blue, not the magenta, cyan and yellow that are printed. This makes working out colour compositions a little tricky at first.

The paper is fed one-third of a line at a time, and the image is built-up in strips of colour with each pass over the paper. Because colour pages are made up by overlaying the three colours, they are slow to produce. It takes around 15min to print a relatively complex or colourful image. Of course, this does not compare with a colour laser printer, but, given the difference in price between the Deskjet and most laser printers, it is quite acceptable.

The monochrome text speed the 500C has been improved over the old Deskjet 500 and it takes around 40sec to print'a mono page. This is not a page printer, so each line of text or strip of a graphic image is built up as data is received from your computer. The relatively high number of nozzles in the printhead ensures that the print quality is certainly impressive, although large areas of ink get rather 'wet' and the paper can crinkle, or even smudge. The right paper is important for the best results.

Nevertheless, the 500C opens up colour printing to a whole new audience. Budget colour printers have been available before but none have provided this quality. Until now, you had to pay a whole lot more. At last, this is easy, affordable colour.

PRODUCT DETAILS

Product: Deskjet 500C Supplier: Hewlett-Packard, Cain Road, Bracknell, Berks RG12 1HN. Tel: (0344) 360000 Price: £749 Machines: A3000/Archimedes. Printer driver: Available from Ace Computing, 27 Victoria Road, Cambridge, CB4 3BW Tel: (0223) 322559 Price: £15 inc VAT

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Citizen 120D+ (Parallel)	£115.00	£135.13
Citizen 224	£199.00	£233.83
Citizen Swift 9	£162.00	£190.35
Citizen Swift 24e	£235.00	£276.13
Citizen Swift 24xe	£329.00	£386.58
H.P. Deskjet 500	£339.00	£398.32
Star LC20	£130.00	£152.75
Star LC200 Colour	£175.00	£205.63
Star LC24-200 Mono	£205.00	£240.88
Star LC24-200 Colour	£249.00	£292.58

Ribbons (Branded)

Amstrad DMP2000/3160	£5.53	£6.50
Citizen 120D	£3.83	£4.50
Citizen Swift 24 Black	£4.00	€4.70
Citizen Swift 24 Colour	£14.98	£17.60
Epson LX80/86	£4.00	£4.70
Epson FX80,MX80,LX800	£5.02	£5.90
Epson LQ400,550 Fabric	£6.00	£7.05
Epson MX100,FX1000,FX1050	£6.77	£7.95
Epson EX800/1000 Black	£7.91	£9.30
Panasonic KXP145.KXP115	£7.91	£9.30
Panasonic KXP140	£10.00	£11.75
Star LC10	£4.26	£5.00
Star LC10 4 Colour	£6.51	£7.65
Star LC200 Black	£5.96	£7.00
Star LC200 Colour	£11.91	£14.00
Star LC24/10 / LC24 200 Black	00.83	£9.40
Star LC24 200 Colour	£13.62	£16.00
Cartridges		
Canon LBP4 Toner Cartridge	£55.32	£65.00
Canon LBP8 Toner Cartridge	£62.13	£73.00
Canon BJ130 Bubblejet (BJI481)	£10.00	£11.75
Canon BJ10e Bubblejet (BC01)	£16.17	£19.00
Canon BJ300/330 Bubblejet (BJI642)	£11.91	£14.00
Colourjet 132/Canon PJ1080 Black	£9.36	£11.00
Colourjet 132/Canon PJ1080 Colour	£14.48	£17.25
HP Paintjet Black	£21.85	£24.50
HP Paintjet Colour	£25.96	£30.50
HP Deskjet + (Permanent Ink)	£13.19	£15.50
Qume Crystal Print Toner Set	£66.38	£78.00
Qume Crystal Print Drum Set	£88.51	£104.00

Ribbons (Comp. All of our compatible

ribbons are high quality British brand. We do not sell "White Box" compatible ribbons.

Brother M1009,M1109	£4.00	€4.70
Brother HR10,15,20,25,35 Fabric	£4.30	£5.05
Brother HR10,15,20,25,35 Multistrike	£4.30	£5.05
Canon PW1080A	€4.47	€5.25
Citizen 120D/Swift 24	£3.49	£4.10
Epson LX80,86	£2.98	£3.50
Epson FX80,MX80,LX800,LX850	£3.62	€4.25
Epson LQ500,LQ800,LQ850	£4.17	€4.90
Epson LQ1000,LQ1050,FX1000	£5.32	€6.25
Epson LQ2500,LQ2550	£6.55	£7.70
Epson EX800	£6.55	£7.70
Panasonic KXP1081,1180,1090,1124	£4.26	£5.00
Star LC10	£3.40	£4.00
Star LC10 4 Colour	£5.53	£6.50
Star LC24/10	€4.68	€5.50

Discounts available on all ribbons for quantities of 3 or more.

Please call for prices on any ribbons not listed here. We can supply almost any ribbon required and, dependent on quantity, any colour.

ase Note - Quoting the CARMA Group Code speeds up our search for a ribbon compatible with your printer.

Archimedes/A3000 Software

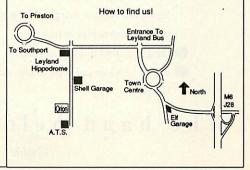
DTP		
Impression II (CC)	£127.66	£150.00
Impression Junior (CC)	£72.34	£85.00
Impression Business Supplement	£41.70	£49.00
EasiWriter (Icon Technology)	£133.62	£157.00
Desktop Folio (ESM)	£79.15	£93.00
Spreadsheets		
Sigmasheet (Minerva)	£40.00	£47.00
Schema (Clares)	£98.72	£116.00
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1st Word Plus Release 2 (Acorn)	£69.79	£82.00
Eas!Word (Minerva)	£16.17	£19.00
Protext 5.0 (Arnor)	£119.15	£140.00
Integrated Packages		
Pipedream 3 (Colton)	£119.15	£140.00
Desk Top Office (Minerva)	£69.79	£82.00
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Datavision (Silicon Vision)	£127.66	£150.00
Flexifile (Minerva)	£84.26	£99.00
Multistore (Minerva)	£154.89	£182.00
Genesis II (Oak Solutions)	£119.15	£140.00
Knowledge Organiser (Clares)	£41.70	£49.00
Accounting Software		
Financial Accountant (S. Vision)	£234.04	£275.00
Home Accounts (Minerva)	£34.89	£41.00
Business Accounts (Minerva)	£298.72	£351.00
Office Tools (S. Vision)	£319.15	£375.00
Languages		
ANSI C Release 3 (Acorn)	£124.26	£146.00
Desktop C (Acom)	£188.94	£222.00
Desktop Assembler (/Acom)	£128.51	£151.00
RiscForth (S. Vision)	£126.81	£149.00
Music		
Armadeus (Clares)	£61.28	£72.00
Rhapsody II (Clares) NEW	£45.11	£53.00
Tracker (Serial Port)	£38.72	£45.50
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Arc DFS (Dabs Press)	£22.98	£27.00
Dot Matrix Colour Printer Driver (Ace)	£12.72	£14.95
Compression (CC) NEW	£41.70	£49.00
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Fun Sch. 3 Under 5's (Database)	£18.00	£21.15
Fun Sch. 3 5-7 (Database)	£18.00	£21.15
Fun Sch. 3 Over 7's	£18.00	£21.15
Graphics Manipulation)	
Poster + Fonts (4Mation)	£79.15	£93.00
Render Bender II (Clares)	£98.72	£116.00
Graphbox Professional (Minerva) NEW	£104.68	£123.00
Graphics - Art		
Pro Artisan (Clares)	£79.15	£93.00
Atelier (Minerva)	£69.79	£82.00
Clipart Coll. Vol. 1 (General)	£19.95	£23.45
Clipart Coll. Vol. 2 (General)	£25.49	£29.95
Clipart Coll. Vol. 3 (Animals)	£25.49	£29.95
Clipart Coll. Vol. 4 (Sport)	£25.49	£29.95
Clipart Coll. Vol. 5 (Characters)	£25.49	£29.95
Misc		
PC-Emulator V1.7 (Acorn)	£93.62	£110.00
Investigator II (Serial Port)	£22.98	£27.00

Price Changes

Please note - all our prices have now been changed. Orders for goods at the old prices will no longer be accepted

Games

	Games			
50.00	Adv. of Sylvia Lain (4th Dim.)	NEW	£17.45	€20.50
35.00	Air Supremacy (Superior)		£17.45	€20.50
19.00	ARCticulate (4th Dim.)		£17.45	£20.50
57.00	ARCtist (4th Dim.)		£17.45	€20.50
93.00	Ballarena (Eterna)		£14.04	£16.50
	Bambuzle		£14.04	£16.50
17.00	Blowpipe (Eclipse)		£14.04	£16.50
16.00	Blaston (Eterna)		£14.04	£16.50
0.00	Blitz (Arxe)		£17.45	£20.50
	Boogle Buggy (4th Dim.)		£17.45	£20.50
32.00	Break 147/Superpool (4th Dim)		£17.45	£20.50
9.00	Bubblefair (Eterna)		£14.45	£16.50
10.00	Cartoon Line (Eterna)		£17.45	£20.50
	Cataclysm (4th Dim.)	NEW	£17.45	£20.50
40.00	Chess 3D (Micropower)		£14.04	£16.50
32.00	Chequered Flag (CIS)		£17.45	£20.50
	Chocks Away Version II (4th Dim.)		£17.45	£20.50
	Chocks Away Extra Missions		£14.04	£16.50
50.00	Chocks Away Compendium		£28.00	£32.90
99.00	Chuck Rock (Krisalis)	NEW	£19.57	£23.00
32.00	Drop Ship (4th Dim.)		£14.04	£16.50
40.00	E - Type (4th Dim.)		£14.04	£16.50
19.00	E - Type Compendium (4th Dim.)	NEW	£17.45	£20.50
	Elite (Hybrid)		£32.00	£37.60
75.00	Enter the Realm (4th Dim.)		£17.45	£20.50
41.00	Fine Racer (Eterna)		£14.04	£16.50
51.00	Grievous Bodily 'ARM (4th Dim.)	NEW	£17.45	£20.50
75.00	Holed Out Compendium (4th Dim.)	MEW	£17.45	£16.50
0.00	Hostages (Superior)		£14.04 £14.04	£16.50
	Iron Lord (Cygnus) Inertia (4th Dim.)		£14.04	£16.50
46.00	Interdicter II (4th Dim.)		£23.83	£28.00
22.00	James Pond (Krisalis)	NEW	£19.57	£23.00
51.00	Kerbang (Eterna)		£11.06	£13.00
49.00	Leg. of the Lost Temple (Eterna)	NEW	£17.45	£20.50
	Lemmings (Krisalis)		£19.57	£23.00
72.00	Mad Professor Mariarti (Krisalis)		£14.47	£17.00
53.00	Magnetic Scrolls Colln (Virgin)		£25.11	£29.50
45.50	Manchester Utd. (Krisalis)		£19.57	£23.00
	Manchester Utd. Europe (Krisalis)		£19.57	£23.00
	Master Break (Superior)		£14.04	£16.50
27.00 14.95	Microdrive 3D World Edition (CIS)	NEW	£21.70	£25.50
	Mig-29 Super Fulcrum (Domark)	NEW	£29.79	£35.00
49.00	Nevryon (4th Dim.)		£14.04	£16.50
Nipo	Pandora's Box (4th Dim.)		£17.45	£20.50
21.15	Poizone (Eterna)		£14.04	£16.50
21.15	Powerband V. II (4th Dim.)		£17.45	£20.50
21.15	Rockfall (Eterna)		£14.04	£16.50
	The Real McCoy 1 or 2 (4th Dim.)		£20.85	£24.50
	Thing of Darkness (Eterna)	NEW	£20.85	£24.50
93.00	Tower of Babel (Cygnus)		£17.45	£20.50
16.00	Twin World (Cygnus)		£14.04	£16.50
23.00	Saloon Cars (4th Dim.)		£17.45	£20.50
	Speech (Superior)		£14.04	£16.50
93.00	Wimp Game (4th Dim.)		£14.04	£16.50
32.00	WorldScape (Eclipse)		£14.04	£16.50
23.45	World Champ. Boxing Man. (Krisal	is)	£19.57	£23.00
29.95	World Champ. Squash (Krisalis)		£19.57	£23.00
29.95	Wonderland (Virgin)		£24.26	£28.50
29.95	X-Fire (4th Dim.)	NEW	£17.45	£20.50
29.95	Zelanites (MicroPower)		£17.45	£20.50
Let In	Please ring for current	prices	on soft	ware
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SCANLIGHT SCANLISHT A4 & JUNIOR SINGER

RACK OCK PRICES
ATLOMER PRICES

canLight A4 is a full A4 width hand-held scanner with an optional motorised sheet feeder (shown in picture) which ensures you get the best possible scan every time. ScanLight Junior is an A6 (105mm) hand-held scanner.

The ScanLight package includes the ScanLight Plus software which provides a wide range of image manipulation options.

Only ScanLight gives you so many features at a budget price:

- four scanning resolutions, 100-400 dpi
- preview during scanning,
- precise control over contrast, brightness and gamma correction
- sampling options to produce true grey level images
- greyscale dithering for top quality screen display
- ScanLight uses a single image in memory for transforming, rotating, enhancing, cropping etc. without losing the original image - all competing scanners require two or more copies in memory
- image rotation through any angle
- ability to select and copy to any section of the scanned image

New lower prices:

ScanLight A4 £299.00+ VAT (£351.33) Special price A4 scanner + sheet feeder £399.00 + VAT (£468.00)

ScanLight Junior £129.00 + VAT (£151.58)

ScanLight A4 and ScanLight Junior are suitable for the Archimedes 300, 400 & 500 series and the new A5000. A special internal version is available (at the same price) for the BBC A3000. Recommended minimum RAM size- 4Mb for the A4 and 2Mb for the Junior.

For more information on the ScanLight range or any of our other products, contact:

Computer Concepts Ltd

The hand held scanner for the Archimedes

Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX. Tel.: 0442 63933 Fax.: 0442 231632

WIN AN ARM3

Want to make your machine go faster? Then enter our competition and win a Watford Arm3 upgrade

f you own a BBC A3000 or Archimedes, but want to make it go faster, the answer is to have an Arm3 upgrade in your machine.

Now BBC Acorn User, in conjunction with Watford Electronics, is giving you the chance to win a Watford Arm3 upgrade for your machine, worth £249, in this easy-toenter competition.

All you have to do is study the three questions below. Put the answers on a postcard with the completed tie-breaker and send it to us at the address given below. The first correct entry with the most original tie breaker phrase, as judged by the magazine and Watford Electronics, will win the Arm3 upgrade board for an A3000 or Archimedes.

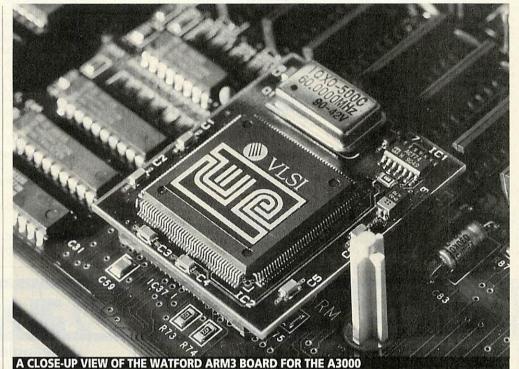
And don't worry about the fitting of the board - this will be done absolutely free by Watford as part of the prize.

WHAT ARM3 DOES

The standard A3000 or Archimedes is a fast machine, thanks to the clever combination of the Risc OS 2 operating system and the Arm2 CPU (central processing unit).

However, since the introduction of the earlier Archimedes machines, time and technology have moved on, and the demand has been for faster operating speeds. Hence the introduction of the Arm3 chip, which was originally introduced by Acorn in the A540 machine and is now to be found in the latest A5000.

Third party developers, including Watford Electronics, were quick to realise the potential benefits of a go-faster chip for the current Arm2fitted machines, such as the BBC A3000 and Archimedes. Watford was one of the first companies to develop its own Arm3 upgrade for the Archimedes and has recently



released a new version, suitable for the A3000 machine.

WHY IS IT FASTER?

The Arm2 chip reads data directly from the 'slow' in the A3000, whereas the Arm3 first reads data into its cache, then operates on it from there. This memory can be accessed faster. Having this 4K 'cache' version of the Arm2 installed in your machine means that it can go about three or four times faster, depending on the task in hand.

The Arm3 chip is supplied on a board. To fit one to an you Archimedes simply remove the Arm2 chip with a special extraction tool provided and fit the new board into the socket.

Because of surface mounting techniques used on the A3000, fitting by a dealer is recommended. Watford offers a fitting service for its upgrade for the A3000. The Arm3

requires supporting software to kick it into action. Watford includes two pieces of software to control the cache - one sits on the icon bar and allows the cache to be switched on and off by clicking on it, while the other software allows this to be done with definable key

presses. Once an Arm3 is installed, you immediately notice how much more quickly the machine reacts. So, to enter the competition, simply read the questions below and send in your entries to reach us by March 2 1992. Our usual competition rules apply.

ARM3 COMPETITION OUESTIONS

Please put your answers and the completed tie breaker on a postcard, not forgetting to include your own name, address, and telephone number. The address to send it to is: Watford Arm3 competition, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ

- 1. What is the speed of light? a) 639,600,000 miles per hour b) 186,000 miles per second c) 176,000 miles per second
- 2. Which was the first Acorn machine to be fitted with an Arm3 chip?
- 3. Watford Electronics will shortly be moving to their new headquarters. In which town or city will this be located?

I would like to have a Watford Arm3 in my machine because ... (Finish this sentence using no more than 15 words.)

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MIDI Tracker14.00	All prices include
MIDI/Sampler (Econet)75.00	VAT, post & packing
MIDI Interface (S.Port)43.00	VAT, post & packing
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canLight Junior192.00	Cartoon Line, Part 119.50
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oystick Interface (S.Port) .26.00	Chocks Away v219.00
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peech!16.50	The Real McCoy 1 or 224.95
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TDK Discs 31/2" (box 10)	The Wimp Game16.00
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DS/HD, 1.6M (A5000)15.00	Wonderland27.99
	77 Oraci Iana

Cheques/postal orders should be made payable to SENLAC Computing Ltd. (AU) P.O. Box 304

BRIGHTON, BN2 2TT

Don't forget to specify A3000/Archimedes/A5000! Please send a S.A.E for our current price list.

VAT Reg. No. 508 7594 16

Company Registration No. 2277309

A310 memory from £99

8-chip design ensures low power consumption. Compatible with ARM3 upgrades, backplanes, hard discs etc. Larger OS ROM option. Four-layer circuitry reduces electrical noise for trouble-free operation. We have been upgrading 300 series computers for over 2 years. In that time, not a single upgrade which we have fitted has developed a fault and needed repair. "we have had a lot of very positive feedback about the IFEL memory upgrades". Archive.

2Mb RAM - £99

(4Mb version available. 2Mb board is upgradable to 4Mb) Educational and quantity discounts apply.

Send or ring for our free information sheet. Then decide.

A5000 £1499

Acorn's new machine with RISC OS 3, multisync monitor, ARM3, and 40Mb drive. An extra 2Mb of RAM (4Mb total) is included free. Part exchanges considered.

A5000 learning Curve - £1530. (£1797.75 inc. VAT)

A5000 RAM £105

Upgrades your 2Mb A5000 to 4Mb. High quality 4-layer board as recommended by Acorn. Fitting does not involve any soldering. Extra 2Mb (4Mb total) £105. N.B. This upgrade is currently supplied free of charge with both of the A5000 systems above (ie standard

A3000

- Only 8 RAM chips low power consumption
- User fittable no soldering required RAM

version and the Learning Curve).

- Available as a "bare board" (ie sockets, but no RAM)
- 4Mb £148.95 2Mb £55 Bare board £25.50

All prices exclude VAT.



Further information and price list from;



IFEL, 36 Upland Drive, Derriford, Plymouth PL6 6BD. (0752) 847286

The Pineapple Colour Video Digitiser Big Price Reductions!!!

Since we originally introduced the Pineapple Video Digitiser almost two years ago we have not needed to modify the design of the hardware in any respects,. However, the software has been continually improved to the point where the quality and quantity of software supplied is second to none.

Now, because of the large number of sales, we are able to offer a big price reduction which makes colour digitising available to everybody. Also, because we are so confident that you will find the Pineapple Digitiser superior to anything else available, we are happy to offer our Digitisers on 7 days free approval so that you can see for yourself the power of our software.

Some of the features of the Pineapple Digitiser, many of which are still exclusive are as follows:-

- * 16 bit true R G B storage in 256k ram.
- Sequences of frames of a moving picture can be grabbed and stored in memory. Up to 30 frames in a 1mb computer, 200 - 300 frames in larger computers!!

Full screen area normally viewed on a TV set is grabbed in full.

- Images may be processed using our own high speed software routines or Acorn's Change FSI software.
- Quite simply the most powerful and easily used zooming and cropping routines available with any processing package.
- Two independant multitasking applications supplied. Non-multitasking software allows digitising without windows for adding still images to videos
- Our hardware does not use interupts so other applications run at full speed. Latest software includes built-in print routines. (Existing owners please contact
- us for a free update). Hard locking synchronising circuits for best results from video recordings.
- Available in a stand alone box for use with A3000. In this mode it can also be used with 300/400/500 series computers only occupying one expansion slot.
- Free seven day trial.

A300/400/500 £199.00 A3000/Boxed £235.00

Pineapple PAL Coder

The Pineapple PAL Coder is a stand alone unit which provides a coded video signal which can be recorded onto a VHS recorder or fed to a monitor with coded

input.

The unit is inserted in the lead to the R G B monitor and provides an R G B output for the monitor together with a full specification PAL coded output. A second version provides a standard coded output but also provides an S-VHS output for improved quality recordings on S-VHS recorders. Features:

External to computer – no expansion slots used

- Complete sync pulse regeneration providing a full CCIR sync waveform for best results on VHS recorders
- * Selectable to work with 625 interlaced screen modes or 624 line non-interlaced modes.

Standard Version £69.00 S-VHS Version £79.00

BBC PCB Designer

This ever popular Rom based PCB designer is suitable for all BBC micros, It's fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program,. This utilises a 'rats nest' input routine and allows any component to be 'picked-up' and moved around the board without having to re-specify component interconnections.

The full auto-route facilities are available even on an un-expanded model 'B' computer. An Archimedes version is available as a free upgrade to existing BBC owners or at a similar price to the BBC version.

'PCB Auto-route is remarkable. No similar software comes near the price'

£55.00 Manual track routing Auto track routing £85.00 £35.00 **Plotter Driver**

Please add 17.5% VAT to all prices. Postage and Packing free

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THE LAST

Edit may be the one you use, but is it the best? DAVE ACTON looks at a new text editor

text editor is, perhaps, the most basic desktop application and many people make good use of Edit - the simple but effective editor that comes with your Arc. Alternatives are available though, and one of them - DeskEdit from Risc Developments - seems to have much to offer.

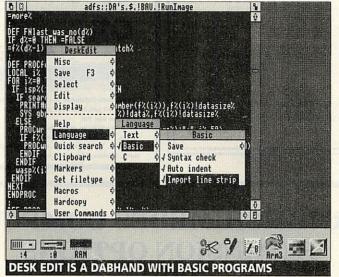
The editor is pleasingly unpretentious and greatly resembles Edit in menus and keys. This makes the switch from Edit to DeskEdit all the easier. With the exception of task windows, all of Edit's features are present, with some new ones added and some of the original ones (such as Search and Replace) in a greatly enhanced form.

NEW FEATURES

The most important difference is perhaps that simple text files, Basic programs and C source files are recognised as different by DeskEdit. For example, in Basic mode, line numbers can be inserted automatically by pressing RETURN (à la Basic Editor) whereas in C mode, curly bracket characters can be auto-inserted and indentation is automatic.

Macros are implemented each of the numeric keys on the keypad can be programmed with a string. Other macros are built in - CTRL-D inserts the date. Separate sets of strings can be set up for C, Basic and text and additional keyboard shortcuts are available depending on the mode. For instance CTRL P can take you to the next Basic PROC.

The search and replace window, although compatible with



Edit, has an extra radio icon marked Wildcarded expressions. When selected, the Power Search mode is entered and a range of buttons and options become available. These provide the same sort of search facilities as you get in Twin. For example, when editing an assembly language program you might want to look for all store instructions referring to certain registers.

This is easily done in Desk-Edit (with the search string STR*, [R[56]). As with Twin, it may take a while to get the hang of the power search, but with practice it is possible to do many things with one or two searches and replace commands that would otherwise need line by line editing.

Simple syntax checking is also possible in DeskEdit. This is of limited use, but I suppose it is quite a handy way of making sure that you have enough brackets on a Basic line.

Printing is not available in Edit (you simply have to save a file on to a printer driver) but DeskEdit does provide a print option. Several levels of printing are provided including a preview option, which brings up the printed version as a text file, and a statistics option, which tells me among other things, that I've now written 667 words. (One of the annoying limitations of Edit is the lack of a proper word count, although you can count spaces for a fair guess.)

NICE TOUCHES

An indexing facility allows you to jump to the first occurrence of the word after the caret. This means that you can precede each of the important areas of your file with special codewords, build an index of these at the top and then jump to the correct place just by moving the caret to the desired name and pressing one key.

Simple but nice. Another minor but thoughtful touch is the ability to make the work area of the editing window wider than the screen. With Edit you have to select a wider screen mode if you're editing a wide listing. You can also get fed up of moving the pointer out of the way in Edit whereas if you press BREAK in DeskEdit the cursor scurries to the right of the screen.

Finally, there are certain circumstances when it is still preferable to use a non-desktop editor. Machine code programs can often crash during development (well, mine do anyway) and I'll still be using Twin to edit them although, if you're confident enough in your programs, you'll find the search and other facilities of DeskEdit comparable with those of Twin. Similarly, the Basic Editor is still a good, reliable way of editing Basic programs and has many facilities that may keep it as the programmer's first choice.

CONCLUSION

DeskEdit offers much to the user as a general purpose text editor. A good deal of thought has evidently gone into its development.

It is a reasonably-priced, unfussy piece of software and makes a worthwhile upgrade from the familiar Edit.

PRODUCT DETAILS

Product: DeskEdit Supplier: Risc Developments Tel: (0727) 40303 Price: £21.23 plus VAT

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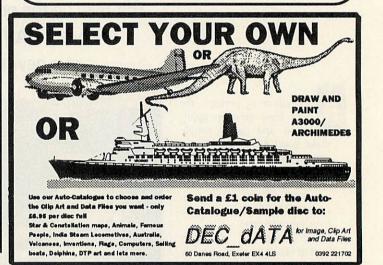
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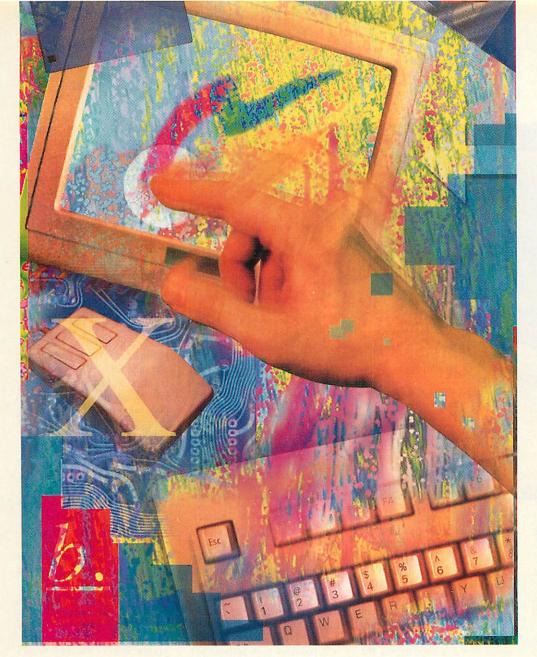
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Using your computer can be as easy as pointing at the screen. CHRIS **DRAGE** examines the latest touch screens

LIFT A FINGER

hildren respond well to natural methods of interaction with the computer and, if this is achieved, their responses can be dramatically improved. Even with the easyto-use Wimp operating system of the Archimedes and A3000, there are doubts as to its suitability for young children. The disabled often encounter problems of a different nature that of using the keyboard.

The touch screen could prove an ideal solution in both cases. It is based on a simple principle, slotting over the existing monitor screen and allowing the user to control a program simply by touching the new 'overlay' screen.

To test the merits of this system, we looked at screens from Microvitec, Keyboard Technology and Lindis. Microvitec has based its product on the Touchtech 3000 screen, whereas Lindis and Keyboard Technology have both plumped for the Touch-Window screen.

TOUCHTECH 3000

Microvitec

Touch screens were pioneered in this country with funds from MEP, and this project resulted in Microvitec marketing its Touchtech 501. It fits over the front of an M series Cub Monitor and eliminates the need to use a standard keyboard at all - you simply touch the screen. Based on infra-red scanning techniques, it opens the world of computing and communication to people who lack fine motor coordination if you can point a finger or stylus at a screen then you can manage to use the Touchtech 501. This was the first model for the Acorn range and is still available for the BBC B/Master 128 computers.

Now, in conjunction with NCET, Microvitec has relaunched its original 501 Touchtech as the Touchtech 3000. This fits on to the Cub 3000 monitor, Microvitec's colour monitor for the A3000. Unlike the Touchtech 501, this device runs via its own power supply unit. Two feet are screwed at right angles on to the bottom of the touch screen - this also serves to tilt the screen making it more comfortable to use. The monitor's rubber feet then snap on to the feet of the touch screen, joining them as a solid unit. Indeed the combination is extremely robust and reliable.

As with its predecessor, the Touchtech 3000 screen is 'hollow' and works by creating a pattern of invisible infra-red rays across the surface of the monitor screen. These enable it to detect when the screen has been touched accordingly. respond and



When the rays are interrupted by the finger or stylus, the position is calculated by the touch screen, and the information is then passed on to the computer program for action.

In practice, the Touchtech 3000 is not as precise as you might imagine. Its infra-red beams are susceptible to being 'fooled' as my four-year-old found when the Touchtech picked up his trailing fingers. This can be overcome by using a pencil. (No stylus is supplied with this type of touch screen.)

The Touchtech 3000 communicates via the serial port. This means that A3000 owners will have to upgrade their machine - the serial port is already there, but the chip, which costs about £20, needs to be fitted.

TOUCHWINDOW

Lindis

Keyboard Technology

The TouchWindow is an American device that has been adapted in this country for the Archimedes by two separate companies; Lindis and Keyboard Technology. It comes with sticky velcro fixing pads, a stylus and a power supply unit package. The 30 × 260mm TouchWindow is less than 10mm deep and, unlike the Touchtech 3000, it will fasten to virtually any monitor, using strategically placed sticky Velcro pads. At present the easiest monitors to attach it to are the Acorn and Phillips old style monitors using a Velcro pad in each corner. Curved monitors like Microvitec's Cub 3000 require special attachments.

The TouchWindow is basically a clear perspex sheet fixed in a light frame. It connects to the computer via the Archimedes serial port and has its own separate power supply. Like the Touchtech 3000, it uses the serial port and A3000 owners will have to upgrade their machine with a new chip.

Once a driver module has been installed on the icon bar, the TouchWindow can be calibrated to match your screen and the settings saved for future use. Two touch points in opposite corners establish the screen size while a third sets the relative position of the pointer to the point touched on the TouchWindow. Other controls can also be set or adjusted: increasing debounce setting will slow down the response but cut out unwanted repetition; drag pause helps the disabled user who cannot maintain contact with the screen and over sampling is used with programs which auto-latch on to items.

In addition, the design of this touch screen means that you can actually take the TouchWindow away from the computer screen: for instance, you can place it over a picture to provide a simple means of tracing a picture into an art package; the stylus comes into its own here.

Although the TouchWindow does get smeared by mucky fingers, it can be cleaned with a damp cloth. However, there is a problem with reflection this is rather more difficult to correct, although altering the contrast does help.

IN USE

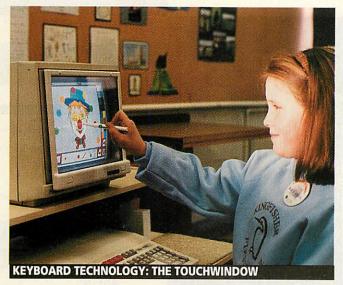
Obviously, the success of any touchscreen depends to a large extent on the availability of good software. Microvitec's pack comes with nine programs, which demonstrate the features of its touchscreen and a variety of simple cause-andeffect applications. They are simple to operate and even children with severe learning and perceptual problems are able to use them successfully. The mouse only needs to be used to load the *Menu* program - from then on all programs are controlled by touching the screen and the mouse is not needed at all.

The disc also contains two touch screen procedures for use in Basic programs and the handbook briefly describes how to achieve this. Touch, a demonstration Basic program, is also included to illustrate how these procedures can be put into practice. However, you can not use this type of touch screen with ordinary desktop programs.

On the other hand, the TouchWindow marketed by both Keyboard Technology and Lingenuity can be used with desktop applications like Genesis or Magpie.

When running down the program's menu tree, you must select Move pointer and then change back to Click-Select. As the mouse and TouchWindow run in parallel you can use whichever is easiest. On some paint programs Select-Drag is a useful default setting. With many types of Wimp-based software, such as David Pilling's excellent Chess program, various mouse button selections must be made in order to, for example, edit the board. Other software, such as My World, latches pieces to eliminate dragging. By setting the program control to Select-Click,





touching an item, taking your finger off the screen and then pressing where you want it to be placed, you can accurately position the piece.

The TouchWindow works with other Risc OS compatible programs, provided that they use only a single mouse function when they run, such as Sherston Software's Viewpoints. With Widgit Software's popular Blob programs the input must be set to Mouse and the Single switch selected.

Where the TouchWindow packages from Lindis and Keyboard Technology differ is in their driving software, although this is similar in both cases. Both systems offer a Touch Control window which allows you to use either your finger or a stylus to emulate any of the mouse functions (the mouse still remains active). The pressure required to touch is not very great, but you do need to maintain contact for a few seconds.

The Keyboard Technology window is superior to that from Lindis - it is smaller and can easily be hidden, moved or revealed. In addition, the Menu remains open when you touch in the Touch Control window - enabling you to change the operating system in a Risc OS-compliant manner.

The problem of multiple open windows obscuring the vital Touch Control window has been neatly overcome by Keyboard Technology: ALT-X will reveal its position, and clicking anywhere on it will bring it to the front; ALT-Z will move the window to another corner of the screen. These hot

key combinations are very convenient. Lindis also offers shortcuts, via the nine number keys on the numeric keypad which emulate the nine buttons on the control window - this is very useful for packages like Atelier which take over the whole screen.

provides several Lindis small example programs on disc with its touch screen. One of these, Touchdraw, is a gem of a drawing program ideal for younger users.

Keyboard Technology can also supply a driver for the BBC Master. Lindis is also working on a Master driver, which should be out next year.

SPECIAL SOFTWARE

At present, there are very few titles that are specifically designed to use with the Archimedes and A3000 touch screens. Brilliant Computing is one company which does offer a range of very useful software to suit the needs of children with a range of learning disabilities. They are also suitable for young children.

The company was quick to recognise the value of touch screens for non-readers, and this has resulted in Touchgames 1 & 2. Containing six and five programs respectively, the packages are well designed and each extends hand and eye tracking, coordination and discrimination tasks, making them ideal for pre-readers.

Another item of software to look out for is Keyboard Technology's First Paint, a Risc OS-compliant primary art program. More programs will no doubt be developed solely for touch screens as they increase in popularity.

CONCLUSION

As alternative input devices, touch screens compare well Concept Keyboards, which are their nearest rivals. They are more natural to use and the relationship between cause and effect is heightened with a touch screen - you simply point directly to what you want to do.

Not only will touch screens work where other methods fail, but they are faster as well. The use of touch screens is not limited to special education, like the Concept Keyboard before them, there are applications for touch screens at all levels of education.

Touchtech 3000, suppied by Microvitec is a simple device, designed specifically for one purpose and from that point of view it functions correctly. It is extremely robust and reliable and requires no finger pressure. However, it only fits the Microvitec Cub monitor, and its imprecision can be a problem. Also, it can seem dated in light of the versatility offered by the TouchWindow, which can be used with a greater range of A3000 and Archimedes programs.

The TouchWindow, supplied by Lindis or Keyboard Technology, is surprisingly accurate and responsive and can be adapted to fit almost any monitor, although it can suffer from reflections in ambient lighting. In addition, its high resolution, together with its ability to be taken off the monitor and used as a touch keyboard, makes it a winner in the touchscreen stakes and is recommended to anyone involved in education for young children or those with special needs.

Which supplier you choose (Lindis or Keyboard Technology) is not a simple matter: neither system seems to have an overall advantage. The differences that do exist are in the implementation of the software and, of course, the price. In general, the evolution of touch screens seems set to greatly contribute towards helping young children, and people with disabilities, to gain computer access.

PRODUCT DETAILS

Product: Touchtech 3000 Price: £299 Suppliers: Microvitec, Futures Way, Bolling Road, Bradford, West Yorkshire BD4 7TU. Tel: (0274) 390011

Product: TouchWindow Price: £244 for screen Cable link + driver software £25 Suppliers: Keyboard Technology, Unit 3, Gordon Road, Meadow Lane Industrial Estate, Loughborough, Leicestershire LE11 1JX Tel: (0509) 610706

Product: TouchWindow Price: £235 including driver software, the link cable and a £5 voucher towards any Brilliant Computing software Suppliers: Lindis UK, Wood Farm, Linstead Magna, Halesworth, Suffolk IP19 0DU Tel: (0986) 85477

Product: Touch screen software for special needs Price: £20 per pack Suppliers: Brilliant Software Tel: (0274) 578239

Product: Touch Screen Software Description: A book about special needs software Price: £5 Suppliers: Ace Centre Tel: (0865) 63508

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ACCESS 2000

A fourth contender in the touch screen stakes, which was not provided for review, is Hybrid Technology's Access 2000. It uses the company's unique Access Link interface and therefore works with a standard A3000 machine without a serial port. This factor, along with its cheaper price, could make it an attractive purchase. Hybrid say that Access 2000 will work with programs controlled by switches or mouse. Any existing switch program can be controlled by touching the screen; the left and right halves take the place of dual switches. Similarly, the mouse pointer can be moved and 'clicked' by a finger on the screen. The package comes with Touchpaint, a special version of Paint, with jumbo sized controls for very young children. It costs £188 in total and details are available from Hybrid on (0223) 861522.

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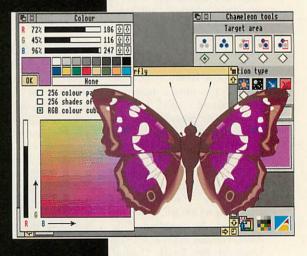
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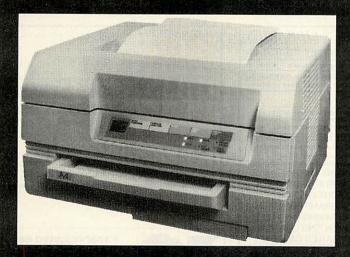
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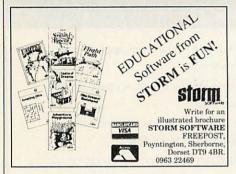
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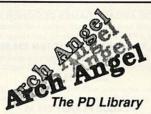
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THE RESIDENCE OF THE PARTY OF T					

Revelation 2 offers many improvements over the original.

PAUL JAMES

tries it out

THE SECOND OMING

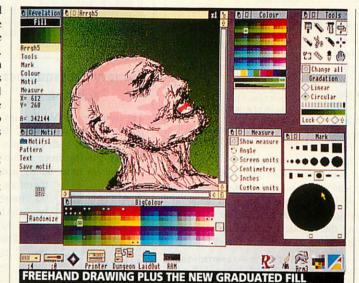
ast April we reviewed Revelation, the first true Risc OS painting package from Longman Logotron. Although in development for a couple of years before its release, the package was still not perfect and there were some problems that needed to be overcome. Revelation 2 is the result.

The problem of not being able to change screen mode while the package is running has now been sorted out - but changing from a 256-colour to a 16-colour mode redefines all the colours in the picture. Revelation 2 still cannot edit a 256-colour sprite in a 16colour mode, so you have to know which screen mode you were using when the sprite was first created.

Another criticism of the first version was the simplicity of the Colour Fill option, which equated to *Paint*'s 'fill everything in one colour' approach. Revelation 2 now allows a graduated colour ramp to be defined in 256-colour modes. This ramp is created by picking the first colour from the palette, clicking on one end of the ramp, then placing the colour at the other end to 'mutate' to. The in-between shades are then calculated.

However, it is difficult to find two colours that will produce the full 16 shades between them, because the colour palette is still a direct representation of the Archimedes native palette, as in *Paint*. The ability to have an enlarged colour palette on the screen goes some way to solving this, but a selection of graduated palettes should have been provided.

Once the graduated palette has been defined, and the



graduation option selected, you can choose either linear or circular fills. The area over which the colour graduates from one end to the other of the ramp, can be chosen by dragging out a rectangle (for linear fills) or a circle using the fill roller. Then, when the Select button is released, the fill takes place. It is also possible, via a slider control, to specify how 'fuzzy' boundaries between different shades are, allowing the shades to intermingle for a smoother effect.

COLOUR SHIFT

The Colour Shift box has been slightly enhanced in Revelation 2 and allows the current picture to have its colours changed in varying degrees for example, you can change all of the red in a picture to green. A new option allows you to cancel the Colour Shift on the picture, but still use the values as a tool.

Posterisation is also possible via the Colour Shift box. This allows the colour of a picture to be muted or completely removed. As a result, the output can be more accurately represented on screen before hard copy is produced on a colour or black and white printer - very few printers are as good as a monitor at portraying colour.

Revelation allowed you to use all the tools on a zoomedup version of the picture. Revelation 2 can now handle zoomed-down pictures as well, but there is still no grid option. Also you still have to use the measuring tool and a sheet of paper to take down coordinates in order to line everything up correctly.

The Pen tool, which allows lines and polygons to be drawn, has also been added to. The width of the line can now be changed with a slider, as can the type of join between lines - mitred, bevelled or curved. Curves are now possible, although they are limited, having only one control point, but this is better than nothing.

Extensions to polygon plotting include the ability to

produce polygons of a definable number of sides. Double clicking on one of the polygon shapes will toggle it between filled and unfilled. I have always liked the ability to change the density of the fill, and this is great for creating canvas-type effects. But there is still no way of producing tilted ellipses.

With the Special Effects tool, trace, edge and blur were always available, but now you can sharpen and dither the selected area.

CONCLUSION

Revelation 2, with its new additions, is a joy and an inspiration to use, and I am still finding new things to do with it. One annoying feature the reason why most other packages don't run in the desktop - is that having menus sitting all over the screen reduces the freehand drawing area. This could be fixed by having the menus hotkeyed for example, pressing CTRL FI could pop-up the colour palette. Further hotkeying to select individual tools would also be very useful. With this, plus the ability to utilise the The Serial Port's graphics enhancer, I believe Revelation 2 would be closer to perfection - as it is, it's not far away.

PRODUCT DETAILS

Product: Revelation 2 Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel: (0223) 425558 Price: Single User £139.83, protected copy £89.30, upgrade from Revelation £50.53, site licence £400 plus VAT Machines: BBC A3000/ Archimedes

Attack of the Killer Numbers!

10 MODEA

50 d=200

60 c=RND(9)

70 REPEAT

80 REPEAT

90 REPEAT

100 k=INKEYO

160 c=RND(9)

110 x=(x-(k=65))MOD10

150 c\$=c\$+CHR\$(c+48)

120 IFLENc\$<9VDU30,x+48,

130 PRINTRIGHT\$("..... ."+c\$,8),s+b
140 IFTIME>d THENTIME=0

170 UNTILOELSEUNTILk=70

190 TIME=TIME-d*(p=0)

\$(c\$,p+1)

230 b=b-4*(x=0)

220 s=s+1

250 m=m+x

180 p=INSTR(c\$,CHR\$(x+48

200 UNTILP 210 c\$=LEFT\$(c\$,p-1)+MID

240 d=d+10*(s MOD10=0)

270 UNTILOELSEUNTILO

260 TFm MOD10=0ANDx>0c=0

20 8=0

30 b=0 40 c\$=""

How many of you remember those Casio watches complete with time, date, alarm, stopwatch, calculator and game? At the time they were a real novelty, and that game whiled away many a dark Tuesday morning in French.

So, I thought it worthwhile to resurrect this gem, in the form of a one-liner! It has been a good many years since I last played the game, so I apologise now if there discrepancies any between my version, shown on the right, and the original.

The idea of the game is to shoot the numbers as they approach from the right. Press A to aim your gun (by changing the number on the left), F to fire. This will destroy the first number matching your gun amongst the aliens. If you miss (by

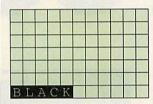
'firing' the wrong number) another alien is added!

Scoring is one point per alien one to nine and five points for a zero. The latter only appear when the sum of the aliens you have killed is a multiple of 10. You lose if an alien lands on your gun. The game is too long to enter as one line so you'll have to squeeze it by using the function key definition given below. Don't try running the listing as is, it won't work!

*KEY0 f=PA.+4:t=f:b=&F5:REP.c=(b<>&F5):?t=-?t*NOTc-58* c:t=t-c:x=f?-1:FOR i=1TOx-4:b=?f:?t=b:f=f+1:t=t+1:N.:f =f+4:U.f?-3=&FF:?t=&D:t?1=&FF:?(PA.+3)=t-PA.|M

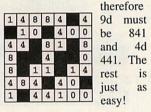
Colour Scheme

Can you fit the eight colours Black, Red, Green, Yellow, Blue, Magenta, Cyan and White on to this grid? Words may be entered horizontally or vertically, all words must interlock in Scrabble format and no extra words may be formed. Black has been entered to give you a start.



January Crossnumber solution

The solution to Mr Davies' puzzle is shown below. If you got stuck with this puzzle, try starting from deducing that 9a must be 81 and



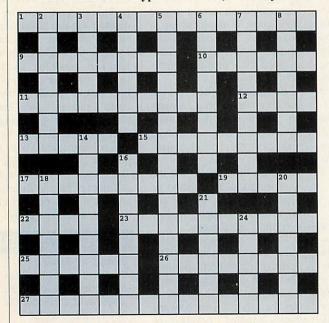
Oops!

Many thanks and a £10 note must go to Colin Singleton of Sheffield for pointing out a couple of mistakes in previous puzzle pages. Firstly the treasure map in the October issue had an arrow missing from it. When transcribing these ancient manuscripts, it's very hard to read past all the dirt and grime... Anyway, enough of excuses, there should have been a three-pace arrow pointing south in square G1.

The second error crept into Nick Craig-Wood's Hexchain-ge puzzle. After asking Nick what he thought of Colin's point it turned out that we printed a good question, but the wrong question! Evidently Nick's solution is for the smallest unique sum of the 16 hex digits. Colin's working for a solution of 'C' (in other words, the decimal number 12) is based on digital roots. By his own admission, there is not just one correct solution.

One of the possible solutions is: FCA0+EB92+ D683 + 4157. But then that's what Nick's puzzle was meant to be ...

BBC Acorn User cryptic crossword, February 1992



Send your entries to BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ to reach us by Friday February 14 1991. Photocopies of your solution are acceptable. The solution (and winner) will be published in the February issue. The winner of December's crossword (answer shown right) is Kevin Finn of Cheshire.

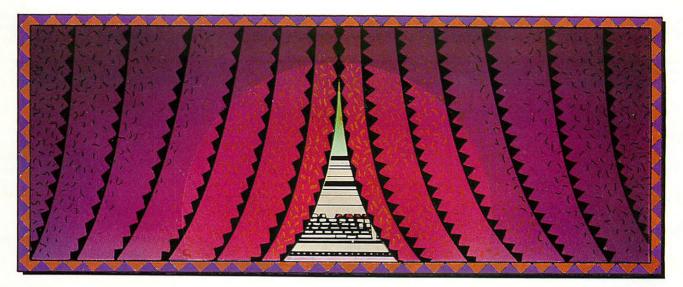
Across

- 1 90° North? (5,10)
- 9 Two basic words for "halt"? (8)
- 10 Do-it-yourself guide (6)
- 11 The door can change shape (10)
- 12 Confront Indian who said I'm an
- 13 Mine! (5)
- 15 Salesman, stuffing his face again and again (9)
- Paws around and digs up insect larvae (4,5)
- 19 Join back up some of the 20 (5)
- 22 Uproarious neighbour starts party that leads to ruin (4)
- 23 Mute has speech sewn up? (6-
- 25 Short-sighted master keeps unknown work close to his heart



- 26 Poor Enid; she met a horrible end because of such food! (8)
- 27 Upset filming of mechanics work

- 2 Sort of illusion seen when rain starts falling from tropical storm
- 3 Local pharmacist displays character (5)
- 4 Result of reactor exploding after oxygen leak perhaps? (6)
- 5 They rob you single-handed! (3,5,7)
- 6 Spotted mostly in pubs (8)
- 7 A short distance north, there's an extraordinary meteor (9)
- 8 Very French sounding noise heard in exchange! (5-2)
- 14 I'm quick to take turn to ad-lib
- 16 Customs require expert to take nothing in cylindrical containers
- 18 Pest has near perfect disguise for getting around in New York
- 20 Goblin (with a grin) chews (and swallows) a slice of lemon (7)
- 21 Worn out clothing? (6)
- "Turn idiot around first, stupid!"



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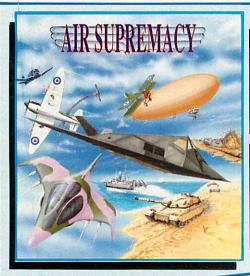
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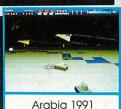




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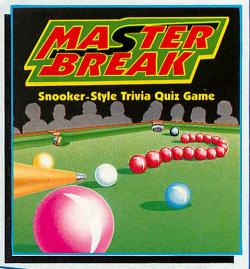
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